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REACTIONS TO INFLUENZA VACCINE

JOHN R. SEAL, *Commander (MC) USN*

IN THE FALL of 1954, the Army, Navy, and Air Force announced a program for immunization of all military personnel against influenza. The main objective of this program was to reduce morbidity and noneffectiveness in military units should either influenza A or B become epidemic during the winter. The vaccine, at the recommendation of the Commission on Influenza of the Armed Forces Epidemiological Board, contained equal parts (250 chick cell agglutinating units) of the FM-1 and Conley strains of influenza A viruses, and the Lee strain of influenza B virus. Manufacture had followed the usual commercial methods, the viruses being grown in embryonated eggs, harvested, concentrated, suspended in aqueous solution, and inactivated with formalin.

At the announcement of this program, concern was expressed by a number of medical officers about reactions to influenza vaccines. A few wished to know if the incidence of reactions would not be such as to offset any possible efficacy of the vaccine in reducing noneffectiveness due to influenza. Because of these questions, it seemed worth while to obtain some information on reactions that occurred during the influenza immunization program prior to its repetition.

REACTIONS CAUSING NONEFFECTIVENESS AT TRAINING CENTERS

In early March 1955, just prior to termination of the immunization program for the season, the five Navy and Marine Corps Training Centers were asked to provide the Bureau of Medicine and Surgery with information about reactions to influenza vaccine causing loss of time from duty. The majority of personnel immunized at these centers were new recruits, although the results given in table 1 are for all populations at these centers.

At the Naval Training Center, San Diego, Calif., the 23 reactions were reported as being mild, and consisting of chills and fever following the inoculation. At the Naval Training Cen-

From Bureau of Medicine and Surgery, Department of the Navy, Washington, D. C.

ter, Bainbridge, Md., the two men sensitive to eggs who received the vaccine had urticaria. One was admitted to the infirmary for 1 day. The other also had an asthmatic attack and was hospitalized for 16 days. The remaining three reactions were diagnosed among Waves. One had dizziness and shortness of breath, with 1 day of illness; a second, headache and chills with 2 days of illness; and the third, syncope, nausea, and sore throat, with

TABLE 1. *Reactions to influenza vaccine causing loss of time from duty at training centers during winter of 1954-1955*

Station	Number inoculated	Hospitalized for reactions		Sick days (average)	Anaphylactic or other severe reactions
		Number	Percent		
NTC,* Great Lakes, Ill.	14,531	5	.03	1.6	0
NTC, San Diego, Calif.	24,976	23	.09	2.0	0
NTC, Bainbridge, Md.	28,019	5	.02	4.8	2**
MCRD,*** San Diego, Calif.	9,230	4	.04	1.8	0
MCRD, Parris Island, S. C.	-	-	.49	1.0	0

*Naval Training Center
**Both in individuals sensitive to eggs who avoided answering questions about egg sensitivity.
***Marine Corps Recruit Depot

4 days of illness. In the report from the Marine Corps Recruit Depot, Parris Island, S. C., it was also noted that about 80 percent of personnel receiving the vaccine had one or more of the following symptoms: fever, chills, muscle ache, tenderness at the site of inoculation, or mild nausea; but of insufficient severity to cause admission to the sick list.

OBSERVATIONS AT MARINE CORPS AIR STATION, CHERRY POINT, N. C.

A special report was received from the Marine Corps Air Station, Cherry Point, N. C., concerning reactions to influenza vaccine. In early January, when the vaccine was first received, 83

TABLE 2. *Incidence of postinoculation symptoms in 83 men*

Symptom	Number	Percent
General malaise	61	74
Swollen arms	61	73
Fever	50	60
Headache	47	57
Chills	42	50
Nausea	25	30
Diarrhea	11	12
Vomiting	7	8

hospital corpsmen attached to the dispensary were inoculated. The incidence of postinoculation symptoms reported by the 83 men the following day are shown in table 2.

Some physicians asked if this vaccine, all of which was of a single lot from one manufacturer (A), might not have been unusually toxic. The Officer-in-Charge, Preventive Medicine Unit No. 2, obtained vaccine made by another manufacturer (B) and assisted in a comparison of the two under conditions in which neither the examiner nor recipient knew which vaccine a man had received at the time he was interviewed for reactions. Fifty-four men were selected for testing, screened for sensitivity to eggs, and examined. Three men had fever and were not inoculated. Administration of the two products was alternated in the remaining 51 men, with 26 receiving that of manufacturer A, and 25 that of manufacturer B.

None of the recipients sought treatment for reactions between the time of administration and 0800 hours the following morning, 21 hours later, when all 51 were again examined. None had fever at this time and all were asymptomatic and fit for duty. Twenty-five of the 26 men receiving vaccine from manufacturer A, and 17 of the 25 receiving vaccine from manufacturer B, reported having a sore arm following inoculation. None of these had abnormal local findings or functional incapacitation. Mild, transient, general malaise was reported by six men, with no difference between the vaccines in this regard. It was concluded that local reactions, although frequent, were mild and that both vaccines were safe.

Following this study, immunization of the balance of personnel at Cherry Point was completed. Another study was made in 123 enlisted personnel comparing different lots of vaccine from manufacturer A. No difference in the incidence of symptoms was reported by men receiving different lots.

Two hundred officers were also questioned regarding symptoms after inoculation, and their replies are reflected in table 3.

TABLE 3. *Symptoms following inoculation in 200 officers*

Symptom	Number	Percent
Swollen arm	100	50
General malaise	83	42
Fever	61	31
Headache	53	27
Chills	40	20
Nausea	21	11
Vomiting	3	2
Diarrhea	3	2

Of the 200 officers, 13.5 percent reported time lost from duty, varying from 15 minutes to 8 days, although none were admitted to the hospital. Several were temporarily withheld from flying as a result of reactions.

In all, 8,000 personnel were vaccinated against influenza at this station with 10 men diagnosed as having reactions to the vaccine admitted to the sick list. Seven of these 10 were later shown to have been ill prior to being vaccinated.

The medical officer's report ended by stating that the rather high incidence of reactions among hospital corpsmen probably had some influence on the reported incidence of reactions in other groups. The rumor had spread that the Medical Department was concerned, and in consequence, unpleasant aftereffects of vaccination were expected and probably searched for.

DISCUSSION

From all indications, the influenza virus vaccine administered to military personnel during the winter of 1954-1955 was responsible for a relatively high incidence of mild local symptoms and a lesser incidence of mild systemic symptoms, but rarely caused a reaction of sufficient severity to necessitate hospitalization or loss of time from duty. Such symptoms as did occur were transient and even the more severe reactions did not last more than 24 hours in nearly all instances. Anaphylactic-type reactions were not reported, except in the two instances where the vaccine was administered to persons with pre-existing sensitivity to eggs.

The experience reported at the Marine Corps Air Station, Cherry Point, N. C., was similar to that observed by others who have interviewed personnel in the postinoculation period. Only 9 percent of a group of 550 students at the University of Minnesota, vaccinated with influenza vaccine during the winter of 1944-1945, stated that they had no reaction.[1] Local reactions were experienced by 91 percent and systemic reactions by 18 percent. In a control group of 539 students inoculated with normal saline solution containing formalin and a preservative in the same concentration used in the influenza vaccine, 10 percent had local reactions and 0.7 percent systemic reactions. These "reactions" consisted only of pain and local soreness of the arm on the day of inoculation in most, and only 4 students were sufficiently ill to require hospitalization for from 12 to 24 hours. At the University of Michigan, in the same winter, 48 percent of students inoculated with influenza vaccine had systemic symptoms, and 73 percent had local symptoms.[2] A more recent observation on a larger group of adults was made in England during the winter of 1952-1953.[3] A total of 6,340, including 1,303 personnel of the Army and Royal Air Force, were vaccinated. Local reactions classified as moderate and interfering with normal

activity were reported in 2.6 percent of persons vaccinated, and general reactions of the same degree in 1.2 percent. Local reactions classified as severe and causing absence from work were reported in 0.1 percent of persons vaccinated, and general reactions of the same degree in 0.5 percent. It was noted that large variations occurred among various groups of individuals, and that an equal or higher percentage of reactions occurred in persons given a control bacterial vaccine.

Some of the immediate stinging and burning following inoculation is probably due to the formalin content of the vaccine and, as indicated in the experience of the University of Minnesota, some part of the local and systemic symptoms are probably not related to the virus content of the vaccine. A majority of the systemic and local symptoms, however, have been shown to be related to the influenza virus content of the vaccine[4] and are unavoidable unless ways are found to reduce the virus protein content without impairing the antigenic potency of the vaccine.

Because the primary purpose of immunizing military personnel against influenza is to reduce noneffectiveness during influenza epidemics, when 10 to 20 percent or more of the personnel may have a febrile illness of several days' duration, the comparatively minor nature of local and systemic reactions reported during the winter of 1954-1955 would not seem to offer any obstacle to continued use of the vaccine.

SUMMARY

Reports on the incidence of reactions to influenza virus vaccine used in military personnel during the winter of 1954-1955 were obtained from the three Naval Training Centers and two Marine Corps Recruit Depots. Reactions eventuating in admission to an infirmary or hospital occurred in less than 0.05 percent of personnel immunized. Further studies were reported from a Marine Corps Air Station indicating that a high percentage of recipients of the vaccine had transient, mild, local, and systemic symptoms with relatively little incapacitation or loss of time from duty.

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TOXICOLOGY IN THE FAR EAST COMMAND

HAROLD J. ANTONIDES, *Captain, MSC, USAR*
TOMAS C. JEFFERIS, *Lieutenant Colonel, MSC, USA*

THE toxicologic problems encountered in an overseas medical laboratory are broad in scope and frequently have aspects peculiar to the particular geographic area and environment. In areas outside the zone of the interior a military medical laboratory is frequently assigned many functions which in the United States would normally be assumed by other federal, state, or local agencies.

In the Far East Command the toxicology section of this laboratory performs the routine toxicologic analyses necessary for the treatment of patients or establishing the cause of death. In addition, this laboratory also furnishes support for law enforcement agencies of the Armed Forces in the detection of users of various illegal and dangerous drugs readily available on the illicit market. Co-ordination with the Far East Criminal Investigation Laboratory is closely maintained in order to obtain maximum medicolegal data in any particular case. This laboratory performs analyses on all biologic fluids and tissues and the Far East Criminal Investigation Laboratory analyzes all confiscated materials.

In the armed services the Military Police (Criminal Investigation) Detachment, the Office of Special Investigations of the Air Force, and the Office of Naval Intelligence are concerned with the investigating of violations of military laws and regulations and Federal laws relating to narcotics and drugs. Medical personnel of the armed services assist law enforcement agencies in the detection of narcotics users by performing physical examinations, laboratory analyses, and autopsies. In the case of a death a toxicologic analysis is mandatory for establishing a diagnosis of drug poisoning because other findings are often not conclusive.

HEROIN

In Japan and Korea heroin is apparently the illegal drug most commonly used by military personnel. It is usually sold on the illicit market as a white to pink or brown powder wrapped in triangular paper packets. These contain about 80 or 160 mg. in a "half deck" or "full deck" respectively and sell for about 500 yen or 200 hwan (about $1.20) per 160 mg. packet. This amount is

From 406th Medical General Laboratory, APO 500, San Francisco, Calif. Capt. Antonides is now at Research and Development Department, Armour Laboratories, Kankakee, Ill.

usually considered by regular users to be sufficient for two injections or 10 cigarettes. Heroin confiscated from users averages about 60 to 100 percent heroin by assay.[1] The heroin of lower purity has been adulterated; however, the quality of the average product is superior to that illegally sold in the United States.

Many of the users prefer smoking or sniffing as the mode of administration. However, it is probable that as a smoker becomes habituated to heroin he will find it necessary to use injections to satisfy his need. When the heroin powder is incorporated into cigarettes the common brands of cigarettes are used. About ½ inch of tobacco is removed from one end of the cigarette without tearing the paper cylinder. About 15 to 20 mg. of heroin is placed on top of the remaining tobacco and tamped down by striking the cigarette on a hard surface. The end is then twisted to close it. The heroin-loaded cigarette is smoked by igniting the closed end and drawing several deep inhalations. These prepared cigarettes may be smoked immediately or carried for future use in the rear of a package of ordinary cigarettes.

A heroin smoker will not have needle marks and will rarely have the classical constriction of the pupils of the eyes; in fact, he may outwardly appear to be perfectly normal. One who injects heroin will probably bear venipuncture marks on the antecubital veins and/or the veins of the legs and hands. There are others who inject heroin subcutaneously or intramuscularly rather than intravenously. Frequently even those who have taken heroin by injection may not have constriction of the pupils. In some cases, during periods of abstinence from the drug or as the effects of the drug are wearing off, the pupils may be dilated.

Prior to 1952 the detection and identification of heroin, morphine, and codeine in biologic fluids and tissues were usually limited to autopsy cases where large specimens were available for analysis. There was no simple, practical method for the determination of opium alkaloids in a single specimen of voided urine collected from a person receiving the usual therapeutic doses or from illegal users taking corresponding amounts. Frequently urine specimens submitted for toxicologic examinations by various law enforcement agencies are limited in quantity because for legal purposes analyses on only the individual, witnessed voidings are acceptable as evidence. In the fall of 1952 Mannering and associates,[2] at this laboratory, used a recently introduced analytic tool known as paper chromatography in conjunction with the classical extraction procedures and identification tests to develop a toxicologic procedure whereby morphine and codeine could be detected in amounts as small as 25 micrograms in specimens of urine. This analysis for opium alkaloids consists essentially of hydrolysis, extraction at the proper pH with appropriate solvents, paper chro-

matography, and color identification tests. The procedure is designed to show the presence or absence of opium alkaloids, particularly morphine and codeine, in urine. However, modification of the procedure permits the analysis of other biologic specimens, *e. g.*, blood and tissue.

Heroin, if taken, will be detected as morphine due to the conversion of heroin to morphine by deacetylation during the metabolic processes and to the hydrolysis of any unmetabolized heroin in the specimen to morphine during the analysis. The hydrolytic process in the analytic procedure is necessary to free the alkaloid from the conjugate excreted in the urine so that the morphine may be extracted and identified.

DIMETHYLAMINODITHIENYLBUTENE

3 Dimethylamino-1,1-di(2-thienyl)-1-butene is a synthetic chemical possessing addiction-forming and addiction-sustaining properties similar to morphine. As might be expected by its structure, this chemical possesses antihistaminic activity and, as would not normally be expected from its structure, also possesses analgesic effects similar to morphine.[3,4] It is available in Japan under various trade names, *e. g.*, ohton, asmaret, shikiton, reston, monospan, hopiton, baldon-tei, and barudon-T. These products have been placed under the narcotic control acts in Japan and are controlled by the Japanese government in the same manner as morphine or codeine. In the United States a Presidential Proclamation[5] has placed dimethylaminodithienylbutene within the scope of the narcotic drug acts of the United States.

As in the United States, legitimate products in Japan are sometimes diverted to illegal channels and instances occur in which personnel subject to military law illicitly use this drug instead of, or in addition to, heroin and the other available drugs. Dimethylaminodithienylbutene is distributed in an injectable dosage form in amber glass ampules to which are affixed the manufacturer's label. The solution in the vial may be pink in hue or, if old, may have some dark turbidity due to decomposition of the chemical which is unstable in heat or light. As this product is always taken by injection, users will have needle marks and will frequently exhibit symptoms associated with heroin or morphine intoxication. The users are sometimes found in a comatose state. Urine excreted by a person taking this drug may be dark green or purple-black in color.

At this laboratory in 1954, a method was devised for the detection of the chemical in the urine of those taking this drug. The urine is subjected to a process of extractions without prior hydrolysis, followed by paper chromatography of the extract and, finally, color identification tests which give characteristic reactions.[1,6]

MEPERIDINE HYDROCHLORIDE

Meperidine hydrochloride, commonly known in the United States under its trade name of demerol, is found in Japan among United States military personnel primarily as as item obtained from military medical supply channels. Instances in which it is illegally used are confined primarily to members of the medical services of the armed services. Meperidine hydrochloride as obtained from medical supply is easily identifiable by its label on either the multiple dose vial or the single dose ampule. Manufactured in Korea under the names neo-berinal and neo-dolantin, it has been found in the possession of military personnel stationed there.

The dosage form of meperidine hydrochloride available is the injectable type and, therefore, a user should bear needle marks. The clinical symptoms associated with use of this drug are similar to those of heroin or morphine.

An examination of the chromatograph prepared for an opium alkaloid analysis of a urine specimen[2] will indicate the presence of meperidine hydrochloride at the appropriate R_f or position on the paper. The drug is stable to acid hydrolysis and is extracted from urine at the same time morphine or codeine is extracted. After paper chromatography, color and microcrystalline precipitation tests are used for final identification.[7,8]

MARIHUANA

As one of the several varieties of Cannabis, marihuana is found in Korea primarily because of its occurrence as a domestic crop for the production of hemp. Small quantities of marihuana have been found in Japan and presumably have been smuggled in by personnel coming from Korea or from the United States. Marihuana is smoked usually as a cigarette or "reefer," or sometimes in a pipe. The cigarettes are hand-rolled and crimped. Hashish, the resin obtained from the Cannabis plant in the Middle East, has not been found in possession of military personnel within the Far East Command.

Marihuana leaves are always smoked and may produce aggressive tendencies and stimulation of the senses in such a manner that external stimuli are magnified and distorted. A marihuana smoker may have discernible characteristic black stains on the thumb and index finger tip analogous to the yellow-brown nicotine stains on the fingers of tobacco users. A method is available for the detection of marihuana users based on chemical reactions to petroleum-ether washings of the finger stains.[9,10] A procedure to detect marihuana users by analysis of urine specimens is under investigation. This procedure is based on an extraction of the urine by an appropriate solvent and color tests applied to the extractive.[10]

METHAMPHETAMINE HYDROCHLORIDE

Methamphetamine hydrochloride, a sympathomimetic amine, is used extensively by the Japanese[11,12] and by a few military personnel in Japan. It was previously manufactured legally in Japan under the trade names philopon, hilopon, hiropon, helopon, hospitan, methyl propamin, neoagotin, takarapitan, and fukuzedrin. These names have been applied by common usage to all methamphetamine hydrochloride injectables that are now available on the illegal drug market in Japan. This drug is generally administered by injection. It is distributed as a 1 percent aqueous solution in 2 to 3 ml. clear glass ampules, without a label when manufactured illegally, and is sold at prices ranging from 20 to 50 yen (5 to 15 cents). The chemical itself is clandestinely prepared by chemists with laboratory facilities and supplied to the packagers or vendors who prepare the solution and place it in vials under such conditions that their products are unsterile and unsafe for use. In Japan methamphetamine hydrochloride is usually synthesized from either natural or synthetic ephedrine.

The Japanese government has passed laws and regulations prohibiting the sale and use of this drug and has placed enforcement of these laws under the narcotics section of the Ministry of Health and Welfare.

It is reported that, on withdrawal of the drug, Japanese "philopon addicts" have in numerous cases suffered symptoms similar to morphine withdrawal symptoms. These symptoms have varied in duration from 1 to 30 days and in a few cases up to 3 months; however, others have had no withdrawal symptoms.[11]

A philopon or methamphetamine user will bear venipuncture marks on the extremities. While under the influence of the drug a user may have dilated pupils and may or may not be violent or aggressive and suffer from hallucinations or psychoses. It has been reported by Japanese medical and health authorities that users of philopon will eventually develop serious psychoses, exemplified in the first stages by hallucinations induced by external stimuli and later by hallucinations without any stimuli whatsoever.[12]

An analytic procedure for the detection of this drug[13] was developed in 1954 at this laboratory which could be used routinely on a large number of urine specimens, in conjunction with the analysis for opium alkaloids[2] and using the same urine specimen. Methamphetamine hydrochloride is absorbed onto activated charcoal during the course of the opium alkaloid analysis[1] and subsequently is eluted, chromatographed, and subjected to color identification tests for methamphetamine.[14-17]

BARBITURATES

Several different barbiturates have been detected in specimens obtained from military personnel or dependents, and barbiturates in their dosage forms have been found in possession of United States personnel or at the scene of suicides. Barbiturates are from two sources, the military medical supplies and the Japanese market. Most of the barbiturates available in the United States are also manufactured in Japan and are available on the Japanese market. However, many of the barbiturates extensively used by the Japanese are not commonly prescribed in the United States. The barbiturates used in military medical facilities are, of course, those which are most commonly used in the United States. Military medical supply has available such common barbiturates as phenobarbital, secobarbital, amobarbital, pentobarbital, et cetera, while on the Japanese market the most common barbiturates found are ethylcyclohexenyl barbiturate, dimethylcyclohexenyl barbiturate, phenobarbital, and pentobarbital.

Barbiturates are prepared in tablet, capsule, and powder form for oral use and in equal solution for intravenous injection. The barbiturate dimethylcyclohexenyl, known as cyclopan or chickapon, has been reported in the Japanese press and law enforcement agencies as being used extensively by drug addicts in place of heroin or philopon. Military personnel have been found to be using this drug either alone or in conjunction with other drugs obtained from the illegal drug market. The other barbiturates, such as amobarbital, secobarbital, phenobarbital, pentobarbital, and ethylcyclohexenyl barbiturate, have also been detected in specimens obtained from personnel in or with the armed services.

Barbiturates are extracted from the specimens at appropriate pH and a spectrophotometric examination is made;[18] to give conclusive identification, a series of color reactions are used.[19] A system of extraction has been devised whereby a specimen can be analyzed qualitatively for barbiturates concurrently with an analysis for opium alkaloids, methamphetamine hydrochloride, and dimethylaminodithienylbutene. It has been found that by using the combination of spectrophotometric data and color reactions a positive identification is possible for barbiturates, which have heretofore been unidentifiable by either spectrophotometric or color reaction methods as applied to the toxicologic specimens received.

UREIDES

Ureides are commonly used by the Japanese as sedatives, either alone or in conjunction with some of the milder barbiturates. Among the ureides are those commonly known in the United States as carbromal and bromural (bromodiethylacetylurea and α-(bromo-

isovaleryl)-urea respectively). Two additional ureides are also commonly used in Japan; these are acetylbromodiethylacetylurea and bromodiethylpropanylurea. The barbiturate perhaps most frequently associated with the ureides is pentobarbital. The ureides or ureide-barbiturate combinations occur most frequently in Japan as tablets or powders for oral administration. There have been several instances in which suicides have been attempted through an overdose of these products.

Ureides taken orally act as a depressant and cause drowsiness. An overdose will produce coma accompanied by constriction of the pupils. Most suicide attempts with ureides have been unsuccessful apparently because of insufficient dosages.

In numerous instances stomach contents, blood, or urine are submitted for toxicologic examination for identification of an ingested drug. A system of analysis has been devised to be applied to these specimens for the identification of ureides, either alone or in combination with barbiturates, following the method presented in the literature for analysis of the dosage forms.[20-22] Identification tests have been applied to the extractives based on the data given for ureides in *The National Formulary*[21] and *New and Nonofficial Remedies*[22] as they are applied to pharmaceutical dosage forms. The process of analysis consists essentially of extractions, each at appropriate pH, followed by tests for chemical and physical properties.

PENALTIES FOR USE

Military personnel in the Far East Command who unlawfully use heroin, meperidine hydrochloride, dimethylaminodithienylbutene, methamphetamine hydrochloride, or barbiturates may be tried by court-martial under "The Uniform Code of Military Justice." The use or possession of heroin is tried under Article 134 as a violation of a Federal statute while use or possession of the other drugs is tried under Article 92 as a violation of a lawful general order, although in most cases it could be tried under Article 134, which is the more serious charge.

UTILIZATION OF ANALYSES

Results of the various analyses for unlawful drugs are used primarily by the Army, Air Force, and Navy law enforcement agencies to prove definitely that a person has used drugs when he has been found in possession of them or has indicated in some other way that he is a user. Of course, in numerous cases negative reports on persons may serve to exonerate them, at least for a time.

In the event of a positive finding of one or more drugs, the result is incorporated into the case report which is forwarded through channels by the investigative agency to the individual's unit.

The unit then initiates such action as it deems appropriate following the recommendations of the investigating officer. The usual action is trial by a court-martial, and on conviction a period of confinement and/or separation from the service.

In many cases during the course of a general court-martial the toxicologist or chemist must prepare a deposition or appear in the court as an expert witness. In recent months the United States Court of Military Appeals has recognized evidence, obtained by the methods used by this laboratory for the detection of opium alkaloids, as being valid and conclusive. The most frequent objection to this evidence is the chain of custody of the specimen from time of collection until the final analysis. To overcome this objection elaborate paper work and administrative procedures are required.

Findings of unlawful drugs in the autopsy specimens of a person can lead to a determination of "Misconduct" and "Line of duty, no" which results in loss of the 6-months' gratuity pay to survivors. Of importance to the pathologist performing the autopsy is the assistance these tests provide in determining the cause of death.

NARCOTICS STATISTICS

From January through December 1954 about 4,000 specimens, excluding autopsies, were analyzed for the presence of opium alkaloids. From this series of specimens it was found that 441 persons had taken opium alkaloids, as represented by positive reports on 559 specimens. During the year 1953 about 3,000 specimens were analyzed for opium alkaloids, of which 705 contained the narcotics. In numerous cases it has been observed that several specimens taken from the same person at different times and from different localities have been positive for opium alkaloids or other drugs.

A survey in the Yokohama area[23] of military subjects who were narcotics users disclosed that of 164 subjects, 76 percent were Negroes and the remainder Caucasian. The average level of education was 10 years of schooling, and the average age was 23 years. In almost every instance the subject's first introduction to drugs was by a prostitute, but sources thereafter included other "pushers." This does not necessarily reflect command-wide findings; a tri-service survey of the Far East Command established that 20 percent of military users were introduced to the drug by prostitutes, 39 percent by service friends, 21 percent by civilian friends, and 20 percent by peddlers.[24]

Four percent of the subjects voluntarily turned themselves in as users in order to obtain help or cure, while the remaining 96 percent were detected by the Military Police. About 38 percent were arrested by the Military Police for such violations as AWOL,

disorderly conduct, or drunkenness, and subsequent search or questioning disclosed use of drugs. The remaining 58 percent were arrested as a direct result of Military Police criminal investigators' efforts. No detailed study has been made on the users of central nervous system stimulants or barbiturates.

Interesting and informative data have been published by the Japanese Ministry of Health and Welfare concerning the use of philopon in Japan. A report published for September 1954[11] indicated that in that month there were over 123,000 former users reported and over 2,000 current users. The majority of the users were men between 20 and 22 years of age. These persons used from 1 to over 100 vials of philopon per day. It is interesting to note that the three main reasons given by these persons for starting to use the drug were their own curiosity, the urgings of friends, and the drug's purported aphrodisiac properties. It is also interesting to note that many of those who stopped using it are stated to have stopped voluntarily. In a report by the Tokyo Metropolitan Police on philopon users it is revealed that of 1,747 juvenile users 426 have been involved in such crimes as larceny, violent assault, robbery, rape, and murder while presumably under the influence of this drug.[25] Numerous philopon addicts are in Japanese mental institutions for psychiatric therapy or as criminally insane.[12]

DEATHS

From January 1951 through December 1954 a total of 50 deaths in the Far East Command due to opium alkaloid poisoning, as definitely shown by toxicologic and pathologic examinations at autopsy, were reported through this laboratory. The distribution of these deaths by year and by branch of service is shown in table 1.

TABLE 1. *Autopsy findings positive for opium alkaloids*

(from January 1951 through December 1954)

Branch of service	Autopsies				Total	
	1951	1952	1953	1954	Number	Percent
Army	7	9	11	8	35	70
Air Force	1	2	3	1	7	14
Navy	0	0	0	1	1	2
Merchant Marine	1	0	2	2	5	10
DAC*	1	0	0	1	2	4
Total	10	11	16	13	50	100

*Department of the Army civilian

The ages of the deceased ranged from 19 to 40 years with an apparent peak in the early 20's, probably related to the predominance of this age group in the armed services. Seventy-six percent of the deceased were Negro and the remainder Caucasian. In 75 percent of the cases in which the person was dead on discovery, the bodies of the victims were recovered from houses of prostitution. The remaining 25 percent of the victims were found in hotels, latrines, alleys, and parks. In spite of the fact that addiction to morphine frequently leads to loss of libido, 45 percent of the victims were involved in some type of sexual act immediately prior to or at the time of administration of the drug.

On toxicologic examination, significant concentrations of ethyl alcohol are frequently discovered in conjunction with morphine. The concentrations of ethanol usually found in these cases were suggestive of some degree of intoxication prior to or at the time of narcotic administration; however, usually it was not enough to produce acute alcohol poisoning as such. In these cases ethanol taken concurrently with morphine, heroin, or codeine probably produced a synergistic effect on the central nervous system and perhaps accelerated and deepened the depressant action of the alkaloid. In connection with this observation, it should be mentioned that recently there have been several instances, described in Denmark, of death occurring a few hours after morphine injection into persons with alcohol concentrations far below the accepted lethal doses for alcohol.[26] In these cases, morphine in the usual dose of 20 mg. had been administered to aggressive and excitable alcoholics as a sedative, but its use resulted in the patients' deaths.

The essential criterion for establishing the diagnosis of acute opium alkaloid poisoning is isolation of one of the alkaloids from body fluids or tissues, because the autopsy findings on gross or histopathologic examination are not specific for any of these alkaloids. Indicative gross and histopathologic changes are noted in table 2 and are frequently found in persons who have died of acute opium alkaloid poisoning. At autopsy the general appearance is that found in asphyxial death.

It is not unreasonable to suspect virus hepatitis as a complication due to disregard for sterile technic at time of injection of the drugs. On autopsy, some persons were found to have jaundice and hepatitis which in some instances may have been a complicating factor in their deaths. Septicemia also may occur in some cases as a result of contaminated injections.

It should be kept in mind that, if the addict remained in coma for a long period of time, an attempt usually was made, by local physicians or occupants of the house where he lay, to revive him with analeptic drugs, stimulants, or other undisclosed treatment.

TABLE 2. *Indicative gross and histopathologic changes in opium alkaloid deaths*

Changes found at autopsy	Percent of autopsies
Pulmonary edema	78
Pulmonary congestion	62
Cerebral congestion	25
Portal hepatic lymphadenitis	25
Periportal hepatic infiltration	19
Pupil constriction	22
Venipuncture scarring of extremities	62
Upper extremities	43
Lower extremities	19
Thrombophlebitis and obliteration of veins	9
Subcutaneous and intramuscular injection scars	13

There is always the possibility that at this time a hepatotoxic agent may have been given, or that some other agent may have been administered which complicated the picture.

Recently, N-allylnormorphine has been added to the items of medical supply for use as an antidote in opium alkaloid poisoning. The use of this drug on persons in the latter stages of asphyxia has resulted in complete and dramatic recovery within a very short period of time.

SUMMARY

Illegally used drugs found in the Far East Command are primarily heroin, marihuana, meperidine hydrochloride dimethylaminodithienylbutene, methamphetamine hydrochloride, and barbiturates. These products are inexpensive and readily available. The persistently directed efforts of the investigative and law enforcement agencies of the armed services, using sensitive methods of detecting drugs in the urine of the users, may act as an effective deterrent to experimentation by susceptible persons.

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Research has been called good business, a necessity, a gamble, a game. It is none of these—it's a state of mind.

—Martin T. Fischer

CLINICAL EVALUATION OF "DEXTRAVEN," A DEXTRAN OF HIGH MOLECULAR WEIGHT

Preliminary Report

CHESTER W. DRAWHORN, *B. S.*
JOHN M. HOWARD, *M. D.*

With the Technical Assistance of
Alice Johnsen, *B. S., M. A.*

BECAUSE of the need for stockpiling plasma volume expanders for a potential national disaster, clinical evaluation of the limited amount of the available British-manufactured dextran was undertaken at the request of the National Research Council. The purpose of this study has been to determine the clinical characteristics of Dextraven, a British (Benger) dextran preparation of an average molecular weight of 230,000. Plasma retention and urinary excretion were determined in order to evaluate the dextran as a plasma substitute. In view of the fact that other preparations of dextran have been observed to cause a marked hemostatic defect,[1-3] particular attention was directed toward the bleeding time in this study.

METHODS

Dextran was provided as a 6 percent solution in normal saline. Subjects were patients in a stable state. One thousand and eighty cubic centimeters (64.8 grams) of dextran were given intravenously in about 1 hour to each of the five subjects. Prior to infusion control, measurements were made of blood pressure, pulse rate, bleeding time (Duke method),[4] hematocrit, and plasma protein concentration (Greenberg method).[5] An indwelling catheter was inserted and the urinary bladder emptied at the beginning of the infusion. Immediately after the infusion and at 1, 6, 12, 24, 48, and 72 hours, the above measurements were repeated, as were measurements of the dextran concentration in the plasma and urine.[6] The urinary volume was measured after each period and the total urinary excretion of dextran calculated.

RESULTS

The bleeding time is shown in figure 1. In no instance did the bleeding time exceed the upper limit of normal (5 min.).

From Baylor University College of Medicine, Houston Tex. Dr. Howard is now at Emory University School of Medicine, Emory University, Ga.

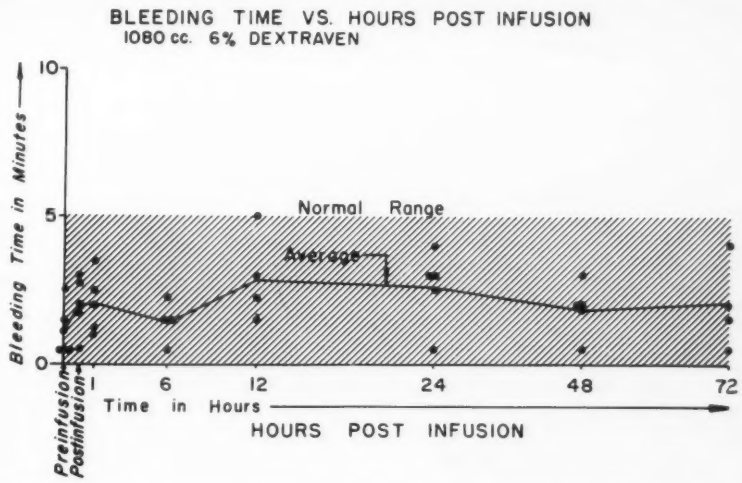

Figure 1. In no instance does the bleeding time exceed the upper limits of normal (5 min.).

In only one patient was a hypertensive effect noted. This moderate blood pressure rise was impossible to evaluate for it occurred in a patient with mild essential hypertension. No other untoward reactions were noted.

Serial studies of plasma dextran concentration are shown in figure 2. At the end of the 72-hour period the plasma dextran level was about one third its postinfusion level.

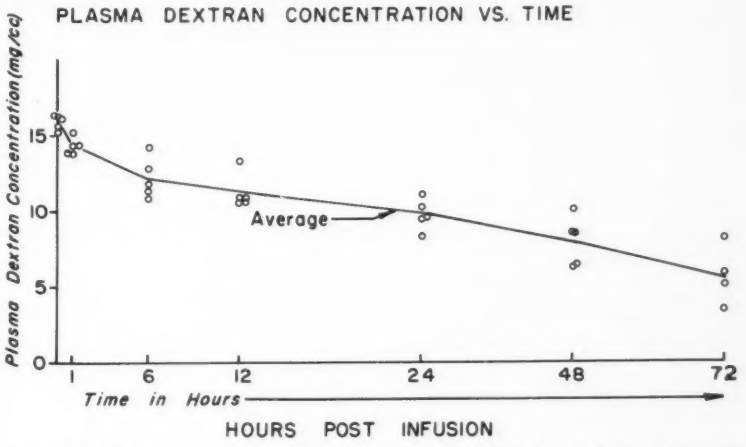

Figure 2. The average plasma dextran concentration at the end of 24 hours is 9.8 mg./cc.

Expansion of the plasma volume is indicated by the depression in the hematocrit and in the plasma protein concentration (table 1). The two results are not identical, but reflect the changes in plasma volume.

TABLE 1. *Comparison of the average percent depressions in hematocrits and plasma proteins*

Hours after infusion	Hematocrit depressions (percent)	Plasma protein depressions (percent)
0	15	18
1	14	20
6	15	22
12	14	19
24	10	12
48	10	14
72	9	8

The percentage of administered dextran which was excreted by the kidney is shown in figure 3. There was a moderate variation among patients in the rate of excretion, the average being 17.8 percent at 72 hours. The relatively rapid excretion in the early hours after infusion presumably reflects the rapid passage of the smaller molecules across the renal barrier.[2]

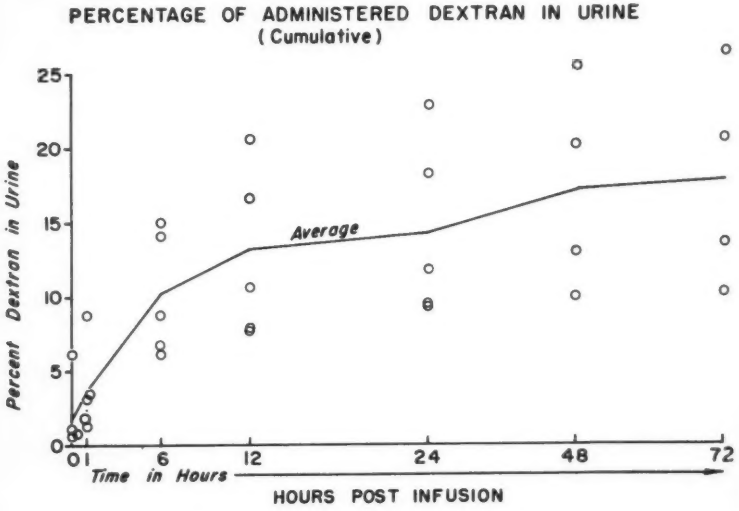

Figure 3. Only a small percentage of the dextran is excreted via the urinary tract.

DISCUSSION

The lack of abnormal bleeding in this study is interesting in that previous authors have found that not infrequently there is a marked hemostatic defect produced by other dextran preparations, which these authors have attributed to plasma retention of the large molecules,[2] or to the degree of retention or metabolism of dextran in the tissues.[3]

The length of effective circulatory support is reflected by the sustained plasma dextran concentration and the duration of the depression of the hematocrit and the plasma protein concentration. An estimate of the original plasma volume (45 cc./Kg. of body weight) corrected serially by the depressions in hematocrit and plasma proteins, in conjunction with the plasma dextran level, gives a rough means of extimating the percentage of the dextran which has been retained in the plasma. This calculation is shown in figure 4. It will be noted that an average of 34.5 percent (calculated) of the total administered dextran is still circulating at

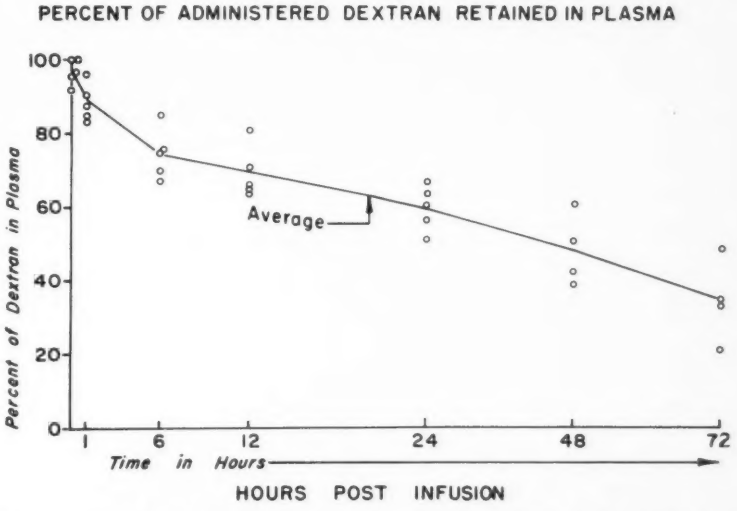

Figure 4. This calculation demonstrates the slow removal of the dextran from the circulatory system.

the end of 72 hours. The percent of the administered dextran unaccounted for in plasma and urine is shown in figure 5. This percentage is metabolized,[7] stored, or lost through other excretory pathways.[8] It is of importance to note that this percentage includes nearly one half of the administered dextran at the end of 72 hours, and that a relatively small part is excreted via the urinary tract.

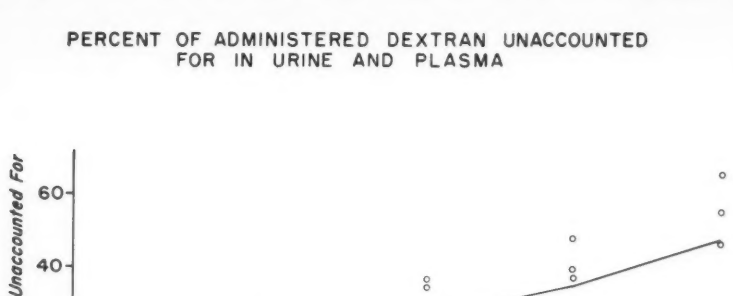

Figure 5. A large fraction of the dextran is metabolized or stored.

CONCLUSIONS

This high-molecular weight dextran preparation caused, in this study, no untoward bleeding or other deleterious manifestation. The dextran supported the circulation for a prolonged period of time, about one third of the dextran being retained in the plasma at the end of 72 hours.

A relatively small, although significant, amount of the dextran was excreted via the urinary tract, averaging 17.8 percent (cumulative) at the end of 72 hours. The largest percentage of this dextran was metabolized, stored, or lost through excretory pathways other than the urinary tract.

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PSYCHOSOMATIC DIAGNOSIS

CHARLES S. MULLIN, Jr., *Commander (MC) USN*

PSYCHOSOMATIC conditions are among the commonest of the illnesses encountered by the service physician. Yet it is my opinion that considerably more time, energy, and anxiety are expended by the average medical officer in a search for organic factors to explain the symptoms arising from an emotional disturbance than is necessary to arrive safely and soundly at the correct diagnosis. No rational physician, regardless of specialty, would hold that a careful effort to exclude organic disease is not necessary. The point is that this effort is unnecessarily prolonged and inefficient.

It is indeed a tragedy to mistake the symptoms of gastric carcinoma for neurotic dyspepsia, but neither is it of benefit to subject a nostalgic recruit to a laparotomy when his abdominal pain and vomiting are expressive of a yearning for home and mother rather than indicative of some primary intra-abdominal disease.

This article is an attempt to describe a more efficient and positive approach to the diagnosis of psychosomatic conditions. Perhaps the commonest reason for the missed or delayed diagnosis is that the possibility of emotional determination simply is not seriously entertained; but when the physician considers that the symptoms at hand may be of emotional origin, it is of value to elicit evidence of basic pathologic anxiety. It is true that some patients with predominating hysterical symptoms may manifest little or no anxiety—at least as long as the hysterical symptoms continue in force—but these are relatively few. The average patient with "functional" symptoms will show evidence of basic anxiety, even though he neither admits "nervousness" nor feels it.

OBJECTIVE EVIDENCES OF ANXIETY

Signs of undue tension should be looked for (due consideration being given, of course, to the possibility that some degree of autonomic overaction may be the result of the examination situation itself or other extraneous influences). The tense, "nervous" manner, the rapid beating of the carotid pulse, paling and flushing, dilated pupils, tremor of the hands, hyperhidrosis, cold moist hands, various aberrations of breathing (for example, sighing, rapid, shallow, or irregular respiration), and aerophagy are useful findings

From U. S. Naval Hospital, Camp Pendleton, Calif.

in this connection. The "pounding" quality of the heartbeat on auscultation without much increase in rate may be significant. One of the more useful indications is palmar sweating. *Cold* sweating palms, especially in the absence of much sweating elsewhere, is a pretty sure indication of anxiousness and is often found in patients who do not choose to acknowledge "nervousness" because of a reluctance to have symptoms degraded as "mental" in origin, or in patients who do not *feel* any anxiety. Sweating of this kind is of particular diagnostic value if the patient realizes that the condition has been present since the beginning of his preoccupying complaints.

SUBJECTIVE MANIFESTATIONS

In addition to these objective physiologic evidences of anxiety, it is important to inquire about the presence of certain subjective manifestations, one or more of which are invariably present in psychosomatic disorders. These include: undue consciousness of heart action, ready breathlessness, increased frequency of micturition, easy fatigability, pressure head sensations, postural dizziness, impaired concentration, "shakiness" on exertion, restless sleep, impaired appetite, morning nausea, or vague gastric distress. Any of these symptoms may be a reflection of an organic disease, but in psychosomatic diagnosis if none of these corollary manifestations are present in addition to the main complaint some doubt justifiably may be cast on the assumption of psychogenesis. These symptoms are especially valuable if they have been noticed only since the patient's presenting symptoms have troubled him. The point is that such symptoms often are not mentioned by the patient, asked about by the physician, or given due consideration if elicited.

It is of some importance to inquire into the past history for evidence of neurotic "predisposition." This "predisposition" may be discerned in the sphere of behavior or of symptomatology. Inquiry can be made into the patient's familial, social, sexual, occupational, and marital adjustments, because the majority of neurotic patients (with the possible exception of some conditions precipitated by severe battle or other traumatic experiences) will show clear evidences of some failure of adjustment in one or more of these areas.

Inquiry should also be made as to the existence of so-called "neurotic" traits; for example: frequent nightmares, sleepwalking, excessive nail biting, prolonged thumb sucking, enuresis, et cetera. Of somewhat more significance in the background is the existence of suggestive "psychosomatic" symptoms in the past. It is well to look for a past history of frequent headaches (often of the "sick" variety), capricious appetite, frequent gastric distress, frequent

dizzy spells and fainting attacks, undue consciousness of heart action, tendency to breathlessness, lack of physical stamina out of proportion to physical build, ready fatigability, susceptibility to frequent colds, tendencies to backache and vague rheumatic pains, menstrual difficulties in women, et cetera. Whenever possible it is useful to evaluate these manifestations in the light of the patient's life situation at the time of their occurrence.

Some consideration should be given to the family history. Except in so-called traumatic neuroses, it is rare indeed to encounter a neurotic patient whose life history does not reveal evidence of some disturbance of his childhood relationships with his parents. Rejective, overprotective, seductive, repressive, dominating, overindulgent parental types in various combinations are invariably encountered in the history of psychosomatic as well as in all other neurotic conditions. In addition, the frequency with which symptoms resembling the patient's principal complaint are also found present in one or more members of the family is striking. This is especially true in the case of headaches, "rheumatic" manifestations, and gastrointestinal disorders. (In a study of 50 unselected cases of British soldiers suffering from neurotic dyspepsia (gastrointestinal series negative), I found a history of chronic gastric disturbance in at least one member of the immediate family in over 70 percent of the cases.)[1]

The careful consideration of the special features of the presenting symptomatology itself is most helpful in arriving at the correct diagnosis. The presenting complaints most commonly encountered, at least in military practice, fall into the following groups: (1) headache, (2) gastrointestinal, (3) cardiorespiratory, and (4) neuromuscular ("rheumatic").

HEADACHE

The vast majority of headaches seen at sick call are psychologically determined, although often the medical officer's first thought is to order roentgenograms of the sinuses and an ocular refraction. There are probably three principal mediating mechanisms producing this kind of headache acting singly or in combination, *viz.*, (1) Vasomotor changes involving intra- and extracranial arteries; (2) mild continuous spasm of the scalp and neck muscles; and (3) a "mental image" of pain—the emotional elaboration of sensations of local tension or discomfort into a severe "painful" experience.

Of these three mechanisms, the last two, acting together, probably underlie most neurotic headaches. This scalp muscle tension-"mental image" type of headache has certain typical features. While it may involve any or all parts of the head there is usually an emphasis on the back of the head and neck. The pain

is typically dull, steady, although sometimes the dynamic pulsation of scalp blood vessels "through" the tense musculature creates a rhythmic throbbing quality to the headache. It is usually associated with a feeling of tightness or pressure. The muscles of the back of the neck often feel "stiff." There is some increase of pain on anteroflexion of the neck and tenderness of the muscles of the posterocervical region and often of the trapezius area. The pain and pressure sensations are markedly aggravated by noise, unpleasurable excitement (pleasurable excitement usually has an opposite effect), heat, and exertion. Usually the patient thinks that the headache "causes" his nervousness and irritability rather than the reverse. But often he does recognize that anger, frustration, and anxiety may precipitate or greatly aggravate his symptoms and this relationship should always be investigated. A significant pointer when elicited in the "tension" type of headache is the effect of wearing headgear. Many patients are quite intolerant of any pressure. In an exaggerated instance, a patient of mine was constantly being reprimanded because he could not bear the weight of his light sailor cap and insisted on walking about the compound holding it in his hand. Finally, this variety of neurotic headache is invariably relieved temporarily by procaine injections.

GASTROINTESTINAL

Complaints referable to the upper gastrointestinal tract, especially to the stomach, are very common and, incidentally, are found more often on the medical rather than on the neuropsychiatric wards. Lower bowel involvement is relatively less frequent. There are some "typical" features of the symptomatic picture of a psychologically determined nonulcerative gastric disorder as seen in service personnel and this will be described. It must be emphasized, however, that while neurotic disturbances may mimic almost any organic disease of the abdominal cavity, on the other hand, certain organic diseases *can* give rise to a picture resembling the symptomatic pattern to be described. Therefore, too heavy reliance should not be placed on this one feature of the entire picture and any patient over 35 who complains of chronic dyspeptic symptoms should have a thorough radiologic survey. However, taken in conjunction with other elements of the total picture, a consideration of the descriptive aspect of the presenting complaint is of much value. The pain is diffuse and vaguely described. It comes on within an hour after meals. Food aggravates rather than alleviates this pain and the effect of alkalies is quite variable. There are inconsistencies in the type of food indicated as especially irritant. Usually "heavy," fried, or greasy foods are avoided, but often preconceived notions are determinant and one patient who can digest milk is unable to take eggs; apples but not oranges; bacon but not fried ham; broccoli but not spinach; et cetera. A fair to good appetite prior to sitting down to the meal, followed by a

loss of appetite or even revulsion at the sight of food or after a few mouthfuls is characteristic. "The food seems to stick on the way down," "lays heavily on the stomach," and "it does not seem to digest properly." Quivery, tremulous, and "nervous" feelings in the stomach are often described. A recognition of the relationship between emotional tension and an aggravation of symptoms is frequently present. Morning nausea is often common. Vomiting is also common—usually within an hour after taking food—and often relieves the distress immediately.

A word might be said at this point about the effects of aerophagy. The commonest cause of aerophagy is anxiety, but the symptomatic consequences of an abnormal collection of air in the esophagus, stomach, and upper bowel, particularly where this air pushes up against the diaphragm and disturbs the anatomic-physiologic relationships within the thorax, may be quite misleading and quite suggestive of such conditions as peptic ulcer, gallstones, heart disease including angina pectoris, intercostal neuralgia, et cetera. Incidentally, aerophagy can cause pain in the left side of the chest which may even radiate to the left shoulder.

CARDIORESPIRATORY

The complaints usually presented are chest pains, palpitations, and breathlessness, alone or in combination. Where no organic basis can be discovered for these symptoms it has been popular to label the condition effort syndrome, neurocirculatory asthenia, disordered action of the heart (DAH), et cetera. Inherent in these terms is the notion of some constitutional or acquired abnormality of the cardiovascular system. Although there may be a small number of patients presenting such symptoms who have a small-sized heart and great vessels, in whom there is little evidence of anxiety, and whose symptoms might bear a relationship to a constitutionally inadequate cardiovascular system, it is probable that the vast majority of patients with effort syndrome, or neurocirculatory asthenia, are neurotic, expressing their neuroses through this particular body "system." The vast majority of patients with emotionally determined cardiorespiratory symptoms have normal-sized hearts, vessels, and capillary structure.

The pain in the left side of the chest of a cardiac neurotic patient is usually "achey" in character with occasional sharp twinges. It is invariably apical in location. I have never seen pain described as substernal and crushing, and rarely is it referred to the basal region, left shoulder, or down the arm, although such radiation can occur. The shortness of breath of which the patient complains is not true dyspnea. There is usually some sensation of oppression through the chest, a feeling of inability to get a "satisfying" breath often associated with frequent and sighing

respirations as the patient tries to get more air and rid himself of the anxious feeling in his chest. Shortness of breath is present on slight exertion, and sometimes if the symptom is scrutinized closely, it is ascertained that the breathlessness begins almost immediately with the commencement of the exertional effort, and indeed seems almost anticipatory. I observed a group of soldiers in a British hospital during the last war, all of whom were suffering from so-called effort syndrome, who experienced much less discomfort from their symptoms of breathlessness, palpitations, and fatigue when they were required to walk up a certain small hill backwards than they experienced when they had to climb the same hill while facing it! The anxiety they experienced was also less.

NEUROMUSCULAR

Aches and pains in various parts of the body, especially in the back and extremities, are frequent complaints. It is probable that muscular "hypertension," *i. e.,* a slight sustained contraction of skeletal musculature similar to the mechanism occurring in scalp muscle tension headaches, is one of the physiologic factors contributing to these aches and pains. Psychogenic backache is extremely common. In these cases sustained muscular contraction, attentional elaboration, and poor posture induced by the impaired morale of the neurotic patient all may contribute to the persistence of the symptom. The generalized muscle ache and pain picture is also rather frequent. Here the pain travels from one part of the body to another. Muscles are involved more often than joints. In the extremity that is currently the most troublesome tremors and increased sweating are often observed. Examination of the part often seems to cause a definite increase in the anxiety independent of pain. Feelings of stiffness, swelling, and tightness of the involved part in the absence of any objective signs are common. When there are aches and pains in the extremities, the lower back is seldom free of pain. And when back pain is complained of, marked weakness of the lower back is invariably present. Hyperesthesia of the skin, often a mere light stroking of the skin of the lower back causing the patient to flinch, is often present. Paravertebral muscle spasm and spasm of the glutei are not uncommon findings in psychogenic backaches. Radiation of pain down the back of the legs is rare. Radiation of low back pain upward is rare in organic affections but not uncommon is psychogenic backache. I have never heard a patient describe a sharp increase in pain on coughing or sneezing who did not in all likelihood suffer from an organic lesion, whatever the psychogenic elaboration.

CAUSATIVE FACTORS

Finally, in establishing a psychosomatic diagnosis it is helpful to search for causative factors. I never have complete confidence

in my diagnosis unless I am able to discern some evidence of plausible psychodynamics. Most psychogenic conditions are the result of a variety of subtly interacting factors, but in most instances the principal precipitating factors and dynamic themes can be discovered if one knows what to look for. In very general terms it may be said that any persisting threat to security of self-esteem, or chronic lack of emotional satisfaction crucial to the person, may give rise to anxiety and depression, and their diverse symptomatic and attitudinal elaborations. Such threats or lack of emotional satisfaction may be inherent in a number of situational patterns. The following are some of those most frequently occurring in the military practice.

The usual and quite obvious domestic, financial, marital, and disciplinary troubles. (Oddly enough, the patient frequently fails to mention important and obvious worries because he does not think they are relevant. Hence, the possibility of immediate conscious problems must always be considered.)

Separation from a milieu of home, family, and civilian life in which the patient felt secure. (Including the familiar nostalgia of the immature recruit.)

General thwarting of emotional satisfaction, inherent in a military setup in a person with strong "dependency needs." This type of conflict may be an important part of the emotional distress of the factor mentioned above, but very often exists independently of the mere fact of separation from civilian securities and support. This is a very common type of conflict and is often more or less subtly disguised, perhaps as an overcompensatory aggressiveness or an air of independence.

Anxiety related to the arousal of hitherto dormant, but potentially powerful hostile impulses as a result of a "temperamental" clash with certain aspects of the military organization; perhaps the restriction and regimentation of the life and the presumed arbitrary discipline, or interpersonal difficulties with specific authoritarian figures.

Homosexual conflicts, conscious or otherwise, brought about by a life of close communal association with other men, as well as anxiety related to other sexual abnormalities.

Increased pressure of work and responsibility—often following promotion—in a basically insecure person.

Traumatic events. A head injury or any abrupt, shocking experience may account for the initiation of a neurotic disturbance. The influence of old combat experiences, even though they occurred many years before, must not be overlooked in this connection.

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A final word of caution: While direct and even "leading" questions are necessary to save time, one should endeavor to minimize the possibility of suggesting symptoms and answers; one should be sympathetic and respectful of the patient or person and avoid a "third degree" approach which could inhibit frank and objective responses.

SUMMARY

The identification of so-called "psychosomatic" conditions can be greatly expedited with benefit to the patient and physician by placing emphasis on the positive, systematic approach to the diagnosis rather than on the customary negative "ruling out" process.

This is accomplished by being alert to the possibility of psychogenicity, by looking for evidence of anxiety, by considering the quality of the previous personality and the family history, by studying the specific features of the presenting symptomatology, and finally, by seeking diligently (but not "overstraining") for plausible psychodynamics.

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EFFECTS OF DRUGS IN VOLUNTEER SUBJECTS

Generalizations from data based on "volunteers" should be cautiously made. This is only an exaggeration of a general problem in investigation. For example, it is well known that certain effects of morphine in a patient with severe pulmonary disease or of digitalis in a patient with congestive heart failure may differ strikingly from those seen in healthy male volunteers. Less well appreciated at times is the fact that even with two groups of healthy males, the incidence of certain "drug effects" may differ markedly. An interesting example is the fivefold increase in the gastrointestinal toxicity of quinacrine in Ohio State medical students when compared with Sing Sing prisoners.

—LOUIS LASAGNA and JOHN M. von FELSINGER
in *Science*, p. 360, Sept. 3, 1954

RADIOGRAPHIC STUDIES IN VARICOCELE

JAMES W. LANE, *Captain, MC, USAR*

THE left-sided idiopathic varicocele is a troublesome problem frequently seen by the military surgeon. Pain is the prominent symptom and sometimes is severe enough to limit the activities of otherwise healthy men. Atrophy of the testis will occur in a few of the patients with a large varicocele.

In the past, opinions regarding the proper management of this problem have been conflicting. Many surgeons avoided operating on varicoceles because of the poor results and frequent complications. Newer concepts of the physiologic disturbance have been developed, however, and accordingly surgical principles and technics have been improved. Reports in the medical literature in recent years indicate a more universal acceptance of the surgical correction of the varicocele.[1-8]

This article describes the physioanatomic causes of varicoceles, shows several illustrative radiographic studies, and mentions some experiences with 26 cases.

PHYSIOLOGIC CAUSE FOR LEFT VARICOCELE

The venous outflow of blood from the testis and epididymis enters the pampiniform plexus of veins in the scrotum. This plexus is drained by a number of veins, and to facilitate this discussion of varicocele they can be divided into two groups. First, there are several veins which ascend in the spermatic cord and coalesce near the internal inguinal ring to form the internal spermatic vein. This vein courses upward behind the peritoneum to join the renal vein on the left side and the inferior vena cava on the right. The other group of veins draining the pampiniform plexus are collateral veins. These veins leave the pampiniform plexus near the neck of the scrotum and connect with veins of the thigh, pelvis, retropubic region, penis, and scrotum (fig. 1A). Anatomic dissections by El-Sadr and Mina[1] have nicely demonstrated this system of collateral veins.

Due to factors poorly understood, the valves in the left internal spermatic vein are prone to become incompetent much more frequently than those in the right. When this occurs, blood flows

From U. S. Army Hospital, Camp Rucker, Ala. Dr. Lane is now at 1123 Virginia Building, Charleston, W. Va.

downward in a retrograde direction in the vein when the person is in a standing position. The pampiniform plexus becomes overdistended. The collateral veins become well developed but are not able to compensate for the increased load. The result is a varicocele (fig. 1B). The varicocele, therefore, is truly a mechanical disorder, just as varicose veins of the legs.

OPERATIVE PROCEDURE

The operation which is generally advocated at present was originated by Ivanissevich and Gregorini[9] in 1918 and repopularized by Bernardi[2] in 1941. The purpose of the operation is to interrupt the incompetent internal spermatic vein and thus halt the retrograde flow of blood into the varicocele (fig. 1C). Ideally this interruption should be done at the terminal end of the vein; however, from a

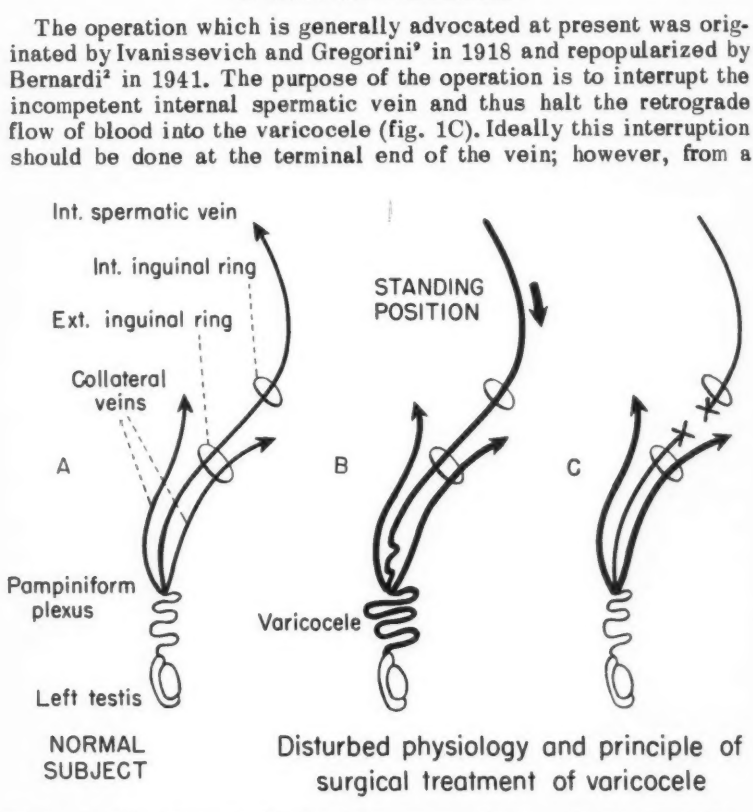

Figure 1. (A) *Schematic drawing of the venous drainage of the pampiniform plexus in a normal person.* (B) *The altered circulation in a standing patient with varicocele. Note the retrograde flow in the incompetent internal spermatic vein.* (C) *Situation following section of all tributaries of the internal spermatic vein.*

practical viewpoint it is best done in the inguinal canal near the internal inguinal ring. Interruption at this level will halt the retrograde flow of blood into the varicocele and at the same time preserve the collateral vessels. Technically the operation is not

difficult. The spermatic cord is mobilized through a short inguinal incision. The investments of the cord are incised, and inspection of the cord structures will reveal two or three prominent, dilated, and sometimes tortuous veins lying in the anterior portion of the cord. These veins can be isolated easily, and about a 2-inch segment of each should be removed near the internal inguinal ring. It is important not to overlook any significant veins. One other point in the technic of the operation must be mentioned. Some of the patients have an unusually low-lying testicle on the left side, and this should be corrected at the time of operation. This is best done by drawing up the distal ends of the ligated veins and suturing them beneath the internal oblique muscle. Thus the spermatic cord is shortened, and the testis is suspended in a better position.

RADIOGRAPHIC STUDIES

In order to study the vascular problem more completely, radiographic studies were carried out in eight patients with large varicoceles and in one normal subject. The venograms were made by performing a venotomy on one of the pampiniform veins in the midportion of the scrotum and injecting 15 to 20 ml. of 35 percent diodrast. In four cases roentgenograms were made with the patient in both the supine and upright positions. Two complications followed these procedures. One patient developed an acute phlebitis in the varicocele. In the other, part of the contrast medium extravasated and caused a painful tissue reaction. Both of the complications subsided without ill effect.

Similar studies have been done by several previous investigators.[1, 2, 10] I was successful in demonstrating two points which were not apparent in the previous reports, namely, the visualization of the entire internal spermatic vein, and the contrast in the size of the collateral veins in a normal subject with those in a patient with varicocele.

The entire left internal spermatic vein can be seen in figure 2. The large caliber of this vein and the tortuous area in its midportion indicate that it is a dilated, incompetent vein. The junction of this vein with the left renal is seen opposite the second lumbar vertebra and the hilum of the kidney. It will be noted that there is not much angulation in the column of the contrast media, indicating that the internal spermatic vein meets the left renal at an acute angle. This is of interest because it is contrary to the universal concept that this is a right-angled junction.

In the venograms in six of the patients with varicocele, the extensive system of collateral veins is demonstrated. In figure 3 most of the contrast media has entered the left saphenous and left femoral veins through a prominent collateral channel inferior to the inguinal canal. This collateral vein is one of the external

Figure 2. This roentgenogram demonstrates the entire left internal spermatic vein in a patient with a large varicocele. The vein appears dilated, and its junction with the left renal vein forms an acute angle.

Figure 3. All the contrast medium has entered the collateral veins. The left saphenous and femoral veins are visualized, being connected with the varicocele by the dilated external pudendal vein.

pudendal veins. In figure 4 there is a different pattern of collateral vessels. Much of the contrast media has entered the internal iliac as well as the external iliac vein.

Figure 4. In this patient with a varicocele the contrast medium has entered the collaterals and can be seen in the internal and external iliac veins.

The only roentgenogram obtained in a normal subject (fig. 5) shows that all the dye had entered the external iliac vein through a small collateral vessel. This suggests that the collateral vessels are important in draining the pampiniform plexus in the normal person. It is of interest to contrast the size of this small collateral vessel with the very prominent ones in patients with large vari-

coceles. This is compatible with the concept that the collateral veins in patients with varicocele undergo compensatory enlargement due to the increased load placed on them.

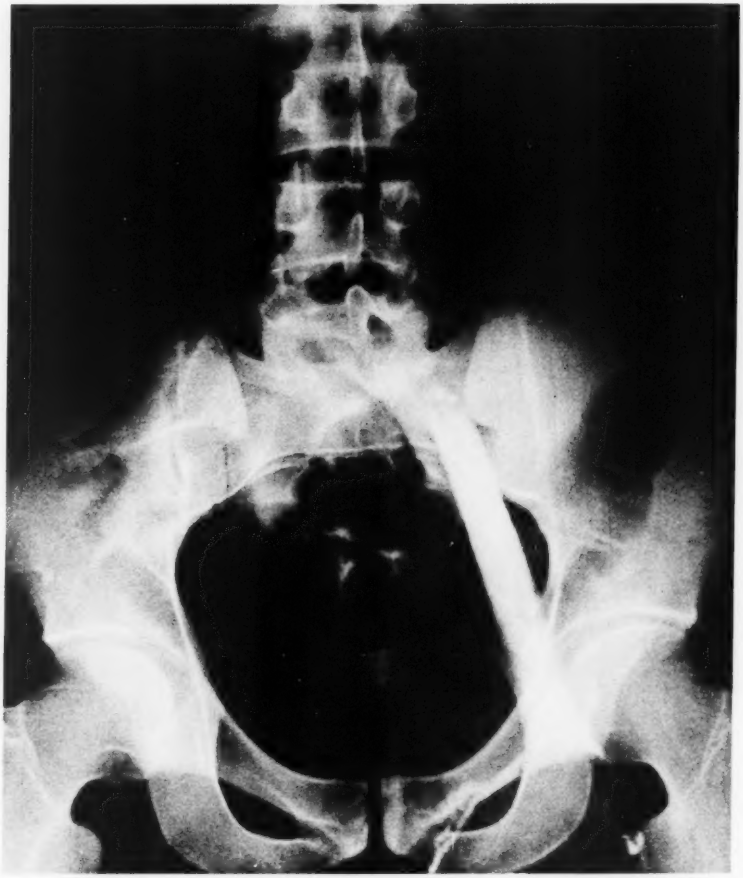

Figure 5. This venogram was made in a normal subject. The medium has entered the external iliac vein through one of the external pudendal veins. Contrast the size of the latter vessel with the size of the corresponding one in a patient with a varicocele in figure 3.

CLINICAL EXPERIENCES

Twenty-six patients with painful varicoceles of moderate to large size were operated on using the technic described herein and were followed for at least 3 months. The longest follow-up was 16 months. Of the 26 patients, 21 had a good result. In each of these the varicocele was corrected, and the patient was relieved of pain.

It is important to analyze the five patients with unsatisfactory results. In two cases there was an incomplete interruption of the internal spermatic vein, and the varicocele persisted following operation. One of the patients no longer had any symptoms, and no further surgical procedure was advised. In the other, a second operation was done 9 months later, and additional veins were ligated. The result this time was very good. A third patient had an unusual pendulance of the testis and scrotum on the left side, and although the varicocele was corrected this symptom persisted. A better result might have been obtained if a better suspension of the testis had been done at the time of operation. The fourth patient had atypical symptoms. The pain was located in both testicles, and even though the varicocele was corrected the pain persisted. The fifth patient was unimproved. The varicocele persisted following operation, and it was assumed that there had been an incomplete ligation of the veins in the spermatic cord. A second operation was done 5 weeks later, and two additional veins were sectioned in the midportion of the inguinal canal. The dissection was done with considerable care, and it was certain that all the tributaries to the internal spermatic vein had been interrupted. The varicocele remained unchanged, however, and one can only conclude that one of the collateral veins had become incompetent. There is no way by which one could ascertain preoperatively whether or not the collateral veins are competent. One must anticipate, therefore, an occasional failure.

To summarize the results in the 26 patients: 21 had a good result, 1 had a good result after a second operation, 3 were improved, and 1 was unimproved. There were no complications from any of the operations. Two of the patients had atrophy of the left testis preoperatively, but in no instance was atrophy of the testis caused by the operation.

DISCUSSION

The inguinal operation for varicocele is based on sound physiologic principles and is becoming accepted as the operation of choice.[2-7] However, one must still exercise conservatism in selecting patients for operation, because a few unsatisfactory results will be encountered. The varicocele should be moderate to large in size, and the symptoms should fall into a typical pattern. Usually these patients will have dull, aching, or dragging pain in the scrotum or low inguinal region. This pain characteristically becomes worse during and following periods of exertion and will subside on rest. It can be noted objectively that the varicocele will become larger during exertion.

Apparently the pain is due either to the weight of the varicocele with traction on the spermatic cord or to circulatory stasis and perhaps some ischemia of the scrotal structures. The impaired

circulation certainly would account for the atrophy of the testis which is sometimes present.

SUMMARY

The pathophysiologic cause of varicocele is described. Radiographic studies may show the various routes by which the blood leaves a varicocele. The entire internal spermatic vein was visualized and the contrast in the size of the collateral veins between a normal subject and a patient with varicocele was illustrated.

Of 26 patients with moderate to large varicoceles, followed from 3 to 16 months, 21 had good results. The causes for the unsatisfactory results in five patients are analyzed, and suggestions are made to avoid poor results. With careful and conservative selection of patients for operation and with close attention to the details of technic, good results should be obtained in most patients undergoing operations for varicocele.

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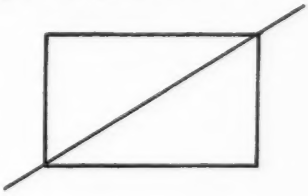
Erratum: At the request of the author of "An Outbreak of Acute Epididymitis Associated with Pneumonitis," which appeared in the July 1955 issue of the *Journal*, the following correction is noted: On page 981, paragraph 3, line 7, "major" should read "minor."

CHARACTER DISORDER: THE TWENTIETH CENTURY "NEUROSIS"

ROBERT L. CHRISTENSEN, *Major, MC, USA*

MY concept of the nature of character disorder has been forthcoming from the 7 years I have spent in military psychiatry. I cannot claim any great degree of originality for these ideas; on the contrary, my role has been primarily one of synthesis or bringing together similar ideas expressed by a number of people at different times. In order to define character disorder as the 20th century "neurosis," a frame of reference is necessary. It is implicit in the title of this article that I believe the 19th century (and I use these time designations broadly, of course) was characterized by something else. That something else was psychoneurosis, or just "neurosis," and it is partly against this relatively familiar entity that I will compare some ideas of character disorder.

First, let us try to represent a person in graphic form. If we assume a square or rectangle to represent the individual person with all his assets, liabilities, and those characteristics generally considered to be emotional and mental, we can divide these features into two groups, classifying them as characteristics either of personality or of character:



On one side are those traits commonly grouped under the heading of "personality"—happy or sad, gay and lighthearted or somber, optimistic or pessimistic, shy and retiring or bold and outgoing, tense and high-strung or relaxed and placid, meticulous or casual, cautious or daring. On the other side are those factors we call character traits—such qualities as honesty, integrity, dependability, consistency, social responsibility, et cetera, and their opposites.

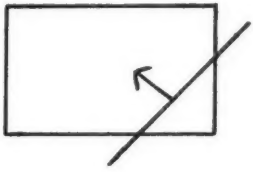
From 121st Evacuation Hospital, APO 971, San Francisco, Calif. Dr. Christensen is now at Veterans Administration, 1305 Franklin St., Oakland, Calif.

It becomes obvious, of course, that at times a particular quality may be on one side, then on the other of our rectangle; or one observer may think that a certain trait is one of personality, while another may classify it as a character trait.

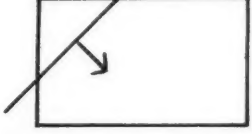
Such difference of opinion must exist; we cannot make nature's plan and complex system fit a diagram or our preconceived notions. Further, we are faced with the arbitrariness of establishing any such dichotomy.

With full realization that this diagram is inadequate, let us see what use we can make of it. Two types of adjustment problems can be represented. First is the neurosis or psychoneurosis, wherein the majority of difficulties lie in the area of personality (personality traits here, when exaggerated, can be regarded as symptoms of neurosis; and we are assuming our individual has adjustment difficulties):

Psychoneurosis



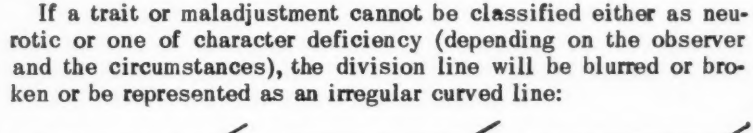
Second is the character disorder, wherein the adjustment problems lie primarily in the area of character structure:



Character disorder

It is important to note that at no time does the line lie outside the rectangle. In other words, there are no pure neuroses, no pure character disorders—adjustment problems are always a combination of neurotic and character difficulties.

If a trait or maladjustment cannot be classified either as neurotic or one of character deficiency (depending on the observer and the circumstances), the division line will be blurred or broken or be represented as an irregular curved line:



Examples of these types of adjustment problems can be given. First, imagine a person with both the symptoms of neurosis and the acting out of character disorder. It may be impossible to say which came first, and it may be useless knowledge to know which came first. It may be difficult to decide which of the two manifestations of the adjustment problem is predominant. Yet, in keeping with the usual practice of medicine, we try to explain the entire clinical picture with one diagnosis. Sometimes a compromise is reached; a diagnosis of neurosis is made, and the predisposition is the concomitant presence of a character disorder. Example: Obsessive-compulsive reaction; predisposition, passive-agressive reaction.

Or the reverse may be preferred, and we diagnose character disorder and list "superimposed neurotic symptomatology" as a manifestation. Example: Emotional instability reaction with superimposed neurotic (conversion) symptomatology.

The blurred or broken line actually represents our ignorance or lack of understanding, both of a patient and of the normal as well as abnormal emotional processes involved. Yet we must do the best we can with our limited diagnostic tools and circumscribed understanding of normal and abnormal psychology. No one else can make the diagnosis for us.

Now for the other example—the curved line. It is possible that an originally neurotic symptom can become infused into the personality structure in such a fashion as to assume the characteristics of a character quirk.

Now let us explore the proposition offered at the beginning: that character disorders were relatively unknown in the 19th century and are ubiquitous in the 20th.

Modern psychiatry began as descriptive psychiatry, and a nomenclature was developed to classify symptom complexes. Subjective symptoms were, of course, the criteria, because no objective tests (resembling physical examination) could be performed to provide a more scientific basis, and because there was nothing else on which to base a classification system.

Symptoms of neurosis are ego-alien, whether they are of organic or psychogenic origin, and are the prime reason that a patient seeks out a physician. Thus in earlier days only patients with subjective symptoms consulted the psychiatrists. It is no wonder that the system which came into existence included essentially only neurosis and psychosis. Acting-out behavior, on the other hand, carries with it but little of the tension and anxiety accompanying most emotional symptoms.

Psychoanalysis, too, in its infancy followed this pattern. Treatment of the psychoses presented a dismal outlook, indeed,

consisting mainly of custodial care. Thus, psychoanalysts concentrated on patients presenting subjective symptoms, *i. e.*, those with psychoneuroses.

Some phases of acting out were recognized—they had to be, one could not ignore them. But in the time-honored tradition of medicine, they were classed as "hereditary" or "constitutional." Probably this is an understandable reaction, because many times physicians can do but little, nature doing most of the healing. When a physician is stumped, he experiences feelings of inadequacy and impotence; these can be relieved by consigning to the patient those puzzling diseases which he cannot help or understand—the patient, then, is responsible for not having the raw materials with which the physician can work. It is in this way that the epithet "constitutional psychopathic inferior" came into being.

As psychiatric and psychologic knowledge grew, the idea developed that all behavior was motivated and directed by emotional forces, and that there could exist symptoms or symptom-equivalents of a more ego-syntonic nature, *e. g.*, acting-out tendencies.

Although the word "constitutional" was reluctantly dropped from the various terms indicating psychopathy (because our best patho-psychologic technics were uncovering no constitutional or hereditary abnormalities), diagnostic nomenclature prior to World War II listed neurosis (psychoneurosis), psychosis, and a polyglot group under one heading—psychopathic personality. The diverse characteristics which could be lumped under this last diagnosis were astounding. The many connotations of this term ran close second to the diversity of the clinical pictures. This, too, may have been an expression of resentment toward persons who, having a troublesome and relatively incurable disease, constituted an assault on the psychiatrist's prestige.

During World War II came the opportunity for clarification. The nomenclature of the Army, not as rigid and inflexible as the American Psychiatric Association and American Medical Association classifications, introduced the term "character and behavior disorders." Certainly this diagnosis seemed to fit better the majority of men being seen by military psychiatrists. (It appears to be generally accepted now that "true psychoneurotics" present relatively little problem and function fairly well, though often at great personal cost.)

In the military, at least, patients with classical psychoneuroses are rare, and it is my impression that this is true also in civilian practice. Assuming this impression to be accurate, there are several possible explanations. Perhaps the lessening of

social restrictions on the expression of sexual and biologic drives is a factor reducing the number of psychoneuroses. Perhaps our ability to diagnose and formulate more skillfully has led to our viewing personality structure in a different and, we hope, more complete way; nevertheless I believe that the change in attitude to sex does play a part.

Also, I believe that the primary problem of this century is that of handling aggressive feelings. With more "civilization" has come greater restriction of direct personal and individual expression of aggressive hostility, and also more extensive and destructive warfare. Even here, however, the personal element is lessened and we often kill our enemies from a distance, sometimes unable to see them, by use of some sort of machine or device with far-reaching effects.

If, then, hostile aggression cannot be expressed directly, it will come out in other ways. Just as psychoneuroses and sexual problems were characteristic of the 19th century, so character disorders and problems of handling aggression seem to be characteristic of the 20th century.

Most assuredly, an area wherein neurotic difficulties may be likely to occur, the sexual area, makes an ideal point of breakthrough of anger. Do we then diagnose the hole in the dike or the force and volume of water behind it as the important aspect? Obviously we should somehow include both; but, of the two, what is behind the dike demands first consideration.

More evidence supporting the thesis that acting-out syndromes are typical of our times can be found in the frequency with which "primary behavior disorder" is diagnosed at child guidance centers. Acting-out is a prime objective symptom, and it would be far-fetched to think this behavior pattern changes when the child grows up.

Indicative of the changing viewpoint is the expansion of the section on character disorders in the newest A. P. A. classification, now definitely larger and more inclusive than the present Army nomenclature that represented the first step in this direction.

Here is the classification of psychoneuroses[1] used by the A. P. A. until changes were instituted in 1952:

Hysteria (anxiety hysteria, conversion hysteria, and subgroups)
Neurasthenia
Psychoasthenia
Hypochondriasis
Reactive depression (simple situational reaction, others)
Anxiety state
Mixed psychoneurosis

And here is the closest approach to character disorders:

Psychopathic personality
with pathological sexuality
with pathological emotionality
with asocial or amoral trends
mixed types

It is significant that, in either the third or fourth editions of Noyes' textbook,[2,3] there is no discussion of primary behavior disorders (1934 classification)[1] or of transient situational personality disorders (1952 classification).[4] Consideration of these minor groups will be omitted.

Following is the classification of the psychoneuroses[4] propounded by the A. P. A. in 1952:

Psychoneurotic reactions
Anxiety reaction
Dissociative reaction
Conversion reaction
Phobic reaction
Obsessive-compulsive reaction
Depressive reaction
Psychoneurotic reaction, other

[And here is the equivalent of character disorder:]

Personality pattern disturbance
Inadequate personality
Schizoid personality
Cyclothymic personality
Paranoid personality

Personality trait disturbance
Emotionally unstable personality
Passive-aggressive personality
Compulsive personality
Personality trait disturbance, other

Sociopathic personality disturbance
Antisocial reaction
Dyssocial reaction
Sexual deviation
Addiction
Alcoholism
Drug addiction

Special symptom reactions
Learning disturbance
Speech disturbance
Enuresis
Somnambulism
Other

Recognition that neurosis can "change" to character disorder is implied in the classification of "obsessive-compulsive reaction" as a diagnosis of neurosis and of "compulsive personality" as a diagnosis of character disorder. Informally, among psychiatrists, character disorder has been carried further to include a "hysterical character structure," and there has even been mentioned a "schizophrenic character."

It may be that symptoms, starting as relatively ego-alien, with some chronic stress gradually become so much a part of personality structure in the broad sense as to cease being ego-alien and to become ego-syntonic. Accepted as part of the self, they are then part of a way of life. This then is much more a character adjustment pattern than a psychoneurosis. A common case, I think, is that of the individual who develops a reaction pattern from infancy, and, for example, grows up excessively meticulous and compulsive. This adjustment is not ego-alien, and therefore not a neurosis.

I have pointed out some of the differences between character disorder and psychoneurosis—symptoms vs. acting out, ego-alien vs. ego-syntonic pattern. There are, however, similarities as well. Symptoms and acting-out are but different sides of a coin. The neurotic develops subjective symptoms because he does not act out. The victim of character disorder does not develop symptoms (and anxiety) because he does act out his feelings. Self-punishment is implicit in both these responses; the motivating source for both is the unconscious. Treatment for either is similar, because the conflicts may be very similar. In treating the neurotic, one helps the patient to work through (take action about) his problems. In treating the patient with a character disorder, one hopes to generate anxiety (symptoms) over his behavior, and over its meaning and unfavorable influence.

Basically, then, there are many similarities. It would appear that a neurotic symptom can, in a sense, develop more persistent and ego-syntonic elements, undergoing a sort of metamorphosis into what may be better described as a character disorder (sometimes referred to by a compromise term, character neurosis). From an economic standpoint, the factor of fixation of neurotic symptoms by monetary compensation is well known to most psychiatrists; this is, however, a separate subject and cannot be discussed here.

SUMMARY

I have tried to define the adjustment problem generally called character disorder, partly by contrasting it against the better-understood neurotic pattern, and have suggested some factors which I believe account for the predominance of this condition in

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the 20th century. Implicit in this presentation is a plea for more accurate diagnosis of the total personality picture, not merely the naming of symptoms (often inaccurate and incomplete). I have also indicated some basic similarities between character disorder and psychoneurosis.

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WHY TURKEY FOR THANKSGIVING?

The Thanksgiving holiday may serve as an illustration of the many ways in which food and emotions are interrelated. There is every reason to doubt that the sudden desire for turkey which overcomes the people of the United States on that day is related to a physiologic need, or to a deficiency not noticeable during the rest of the year. Yet those who must go without turkey and all the traditional trimmings will feel unjustly treated, dissatisfied, and left out. The feeling that every American is entitled to his Thanksgiving turkey is officially recognized, and the Armed Forces and other large institutions supply this viand. Turkey contains no special morale-building vitamin, mineral, or other secret ingredient. Its effect is due to what it stands for, a symbol of home, family, and congenial and abundant living.

—H. BRUCH, M. D.
in *Annals of the New York Academy of Science,* p. 68, July 15, 1955

FURTHER STUDIES OF PARACOLOBACTRUM COLIFORME STRAINS IN THE FAR EAST

WARREN C. EVELAND, *Colonel, MSC, USA*
OSCAR FELSENFELD, *Lieutenant Colonel, MC, USAR*
ROBERT W. BABIONE, *Captain (MC) USN*
DWIGHT M. KUHNS, *Colonel, MC, USA*
ALICE KASE

PARACOLOBACTRUM, a serologically heterogenous group of bacteria loosely designated as "coliforms," was reviewed by Parr[1] in 1939. These organisms are closely related to *Escherichia coli* and/or *Aerobacter aerogenes*, but differ from them in certain biochemical properties—mainly in that paracolobactra are slow lactose fermenters. Four years later Stuart and associates[2] published an extensive study that served as the foundation of a classification of these organisms and from which the term "paracolon bacteria" originated in the literature of the early forties. The basic biochemical subdivision of paracolon organisms, as presented in *Bergey's Manual of Determinative Bacteriology*,[3] was suggested by Borman and associates.[4] These authors proposed the genetic name paracolobactrum and the following subgenera:

1. Acetylmethylcarbinol produced (Voges-Proskauer positive): *Paracolobactrum aerogenoides*.

2. Acetylmethylcarbinol not produced (Voges-Proskauer negative):
   a. Citrate utilized as the sole source of carbon (citrate positive): *Paracolobactrum intermedium*.
   b. Citrate not utilized as the sole source of carbon (citrate negative): *Paracolobactrum coliforme*.

Paracolon organisms which do not form gas from fermentable substances were designated anaerogenic paracolons by Stuart and associates. Of these, the Providence group has been studied extensively.[5]

The subgenus *P. coliforme* has received little attention since the investigations of Stuart and associates, who examined such organisms from patients with diarrhea. These authors studied 223 strains of which 67.2 percent were serologically closely related. Gainor and associates[6] isolated from a patient with panophthal-

From 406th Medical General Laboratory, APO 500, San Francisco, Calif.

mitis a *P. coliforme* that was pathogenic for mice and caused eye lesions in rabbits. The serum of the patient showed agglutinins to a significant level. One had to surmise, therefore, that this group of enterobacteriaceae may be pathogenic for man also.

As far as can be ascertained from available literature, the first classification of *P. coliforme* with the aid of single-factor antigen studies was carried out by Eveland and associates.[7] The present report is a continuation and expansion of that preliminary publication. It is based on the results of the examination of 667* cultures, 642 of which were isolated during a period of about 16 months (1953 to 1954). One hundred and forty-eight of them did not agglutinate with any of the 14 sera used during the previous study. They will be referred to as "further groups" and symbolized as "F." The 519 remaining strains came from the following sources.

Four strains from Japanese soil samples collected to determine if chemical or mammalian fertilizer had been used, and 16 organisms isolated from vegetable samples collected from messes and clubs of the armed services in a study by Col. B. F. Leach and Lt. Col. R. O. Anslow of fecal contamination of indigenous foods in Central Japan.

Eighteen strains from patients with diarrhea in Japanese hospitals, received through the courtesy of the Metropolitan Honshu Hospital and the Kitasato Institute in Tokyo.

One hundred and forty-one cultures isolated from patients with diarrhea in United Nations military hospitals and dispensaries in Japan.

One group of 23 strains from an outbreak of diarrhea at a Marine camp in Japan, which was microbiologically investigated by the Fleet Epidemic Disease Control Unit (FEDCU) No. 2.

Thirty-one organisms from Korea, received mainly through the 1st Medical Field Laboratory; and six strains from the Ryukyu Islands, submitted by the Ryukyus Army Hospital.

Forty-three strains isolated from patients with a diarrheic condition colloquially called "Hong Kong Dog," which afflicts crews of naval vessels in Hong Kong harbor. The cultures were collected during three trips to and from Hong Kong on APA-type ships, by teams made up of personnel of the FEDCU No. 2 and of the Department of Bacteriology of this laboratory. One hundred and fifty-two additional stools for culture were collected from crew members without diarrhea during these trips.

Five organisms isolated from stools collected by First Lt. J. Arrington from airmen who returned to Tokyo ill with the so-called "New Delhi Belly." This was a diarrhea occurring in crews and passengers of airplanes on the Japan-Near East run.

*This figure includes most of the strains reported previously.

Fifteen strains isolated by the FEDCU No. 2 from Indochinese refugees in Camp de la Pagoda near Haiphong, and 40 cultures collected from ill French soldiers evacuated from Indochina via Japan.

A group of organisms of miscellaneous provenance: cultures from the Philippine Islands, cultures from New Britain (collected by Lt. Col. H. Baker), stock cultures received from Dr. C. A. Stuart, and strains from California of a former study.

About 85 percent of the strains from patients with diarrhea were isolated from stools in which no salmonella, shigella, Arizona, Ballerup, Bethesda, or Providence bacteria were isolated.

The first attempts to classify *P. coliforme* were made with the aid of biochemical reactions. All strains fermented dextrose and mannitol rapidly, with the formation of acid gas. They did not produce acetylmethylcarbinol, decompose gelatin, nor use citrate as the sole source of carbon. They were methyl red positive and did not form hydrogen sulfide. Exceptional strains failed to produce indole. The cultures fermented lactose slowly, and did or did not attack the following carbohydrates: sucrose, salicin, adonitol, and dulcitol. The fermentation pattern of these last five carbohydrates depended so much on the individual strain that attempts to classify *P. coliforme* according to their action on these substances had to be abandoned. It was decided, therefore, to use agglutination tests as the main criterion of type differentiation. Because of the known complexity of the antigenic structure of enterobacteriaceae, only "0" antigens were used for the primary classification.

Strains that did not react with salmonella, shigella, and *Esch. coli* 1 to 25, 026, 055, and 111 sera were selected for the production of diagnostic sera. The cultures were grown on tryptose agar for 24 hours at 37° C., washed off with saline solution, and heated for 2 hours in the boiling-water bath. Increasing amounts of this antigen were injected intravenously into rabbits, and the animals exsanguinated when a titer of at least 1:800 was found on test bleeding. The sera were preserved with 1:10,000 merthiolate and kept under refrigeration.

Both tube and slide tests were used, according to the standard method recommended by Edwards and Bruner.[8] As reported in the preliminary communication,[7] 14 "0" antigens were established, which to date have appeared in 123 combinations (table 1).

This enormous variation of the antigenic mosaic may be caused by loss variations. There were isolated, for instance, from the same stools of the same patients simultanously the following *P. coliforme* cultures.

1.—	1,2,3,4,5	1,2,3,4	2	3,4
2.—	2,3,11	3,11	11	

(Continued on page 1614)

TABLE 1. *Distribution of* Paracolobactrum coliforme *strains isolated in the Far East**

"O" antigenic structure	Japan					Naval vessels		Diarrhea in U. N. Forces (other than in Japan)			Indochina		Others	Total
	Soil	Vegetables	Diarrhea in Japanese	Diarrhea in U. N. personnel	Marine camp outbreak	Crews, no diarrhea	Hong Kong Dog	Ryukyu Island	Korea	New Delhi Belly	Indochinese refugees	French soldiers		
1				4		1							2 (a) 1 (b)	8
1,2				6		11		1	7			2	4 (b) 1 (e)	32
1,2,3				2			2		1				1 (c)	6
1,2,3,4			1	2		2								5
1,2,3,4,5			2			7	2						1 (e)	12
1,2,3,7						1								1
1,2,4				1		1								2
1,2,4,6			1											1
1,2,4,7									1					1
1,2,4,10				1		1								2
1,2,5,7,8				1										1
1,2,5,8,9				1										1
1,2,6				2										2
1,2,6,7				1		2								3
1,2,6,7,8				1		2								3
1,2,7				1		2								3
1,2,7,8				4		2								6
1,2,7,8,9,13				1										1
1,2,7,8,13						2							1 (b)	3
1,2,7,8,14						1								1
1,2,7,9				1										1
1,2,7,14						1								1

TABLE 1. *Distribution of* Paracolobactrum coliforme *strains isolated in the Far East**—Continued

"O" antigenic structure	Japan					Naval vessels		Diarrhea in U. N. Forces (other than in Japan)			Indochina		Others	Total
	Soil	Vegetables	Diarrhea in Japanese	Diarrhea in U. N. personnel	Marine camp outbreak	Crews, no diarrhea	Hong Kong Dog	Ryukyu Island	Korea	New Delhi Belly	Indochinese refugees	French soldiers		
1,2,8				1										1
1,2,8,13				1										1
1,2,9				6										6
1,2,9,10,11						1								1
1,2,9,13						1	1							2
1,2,9,14						1								1
1,2,10				1										1
1,2,11				2		1								3
1,2,12				1		3	1		1					6
1,2,13						1							2 (b)	3
1,2,14			4			1								5
1,3,4						1								1
1,3,4,5						3	1							4
1,3,11,14			1											1
1,3,6			1											1
1,3,14													1 (c)	1
1,4						1							1 (e)	2
1,5			2											2
1,6			1						1					2
1,7,8			1											1
1,9			1							1	1	1	1 (a) 1 (d)	6
1,9,13													1 (d)	1
1,10						1								1

TABLE 1. *Distribution of* Paracolobactrum coliforme *strains isolated in the Far East**—Continued

"O" antigenic structure	Japan					Naval vessels		Diarrhea in U. N. Forces (other than in Japan)			Indochina		Others	Total
	Soil	Vegetables	Diarrhea in Japanese	Diarrhea in U. N. personnel	Marine camp outbreak	Crews, no diarrhea	Hong Kong Dog	Ryukyu Island	Korea	New Delhi Belly	Indochinese refugees	French soldiers		
1,11		1												1
1,12				5									1 (b)	6
1,13						2								2
2			1	7		9	2			1	2	6		28
2,3,4						2								2
2,3,4,5						1	2							3
2,3,4,5,6							1							1
2,3,4,5,9		1		1										2
2,3,4,11				1										1
2,3,7,11				1										1
2,3,11				3	13	1			1					18
2,3,14							2							2
2,4,7				2										2
2,5,6,7,9,11,13		1												1
2,5,10				1										1
2,5,11				1										1
2,6									1					1
2,6,7						1			1					2
2,7				1										1
2,6,12,14							1							1
2,7												1		1
2,7,8				1										1

TABLE 1. *Distribution of* Paracolobactrum coliforme *strains isolated in the Far East**—Continued

TABLE 1. *Distribution of* Paracolobactrum coliforme *strams isolated in the Far East**—Continued

"O" antigenic structure	Japan					Naval vessels		Diarrhea in U. N. Forces (other than in Japan)			Indochina		Others	Total
	Soil	Vegetables	Diarrhea in Japanese	Diarrhea in U. N. personnel	Marine camp outbreak	Crews, no diarrhea	Hong Kong Dog	Ryukyu Island	Korea	New Delhi Belly	Indochinese refugees	French soldiers		
2,7,8,9,13,14				1										1
2,8				1										1
2,9				2		1								3
2,9,10,11						1								1
2,9,11						1								1
2,11				2			2							4
2,11,12,14						1								1
2,11,14				1				4						5
2,13						1								1
2,14						1								1
3				4										4
3,4				4		7	2		1		2	1		17
3,4,5			1	11		41	4		1				1 (b) 2 (e)	61
3,4,6,7				1										1
3,4,6,11				1	1									2
3,4,7,13	1													1
3,4,13												1		1
3,6		2		8		1	1		4					16
3,6,7,11							1							1
3,11					4		1		1					6
3,14						1								1
4				3		3						3		9
4,5												7		7

TABLE 1. *Distribution of* Paracolobactrum coliforme *strains isolated in the Far East**—Continued

"O" antigenic structure	Japan					Naval vessels		Diarrhea in U. N. Forces (other than in Japan)			Indochina		Others	Total
	Soil	Vegetables	Diarrhea in Japanese	Diarrhea in U. N. personnel	Marine camp outbreak	Crews, no diarrhea	Hong Kong Dog	Ryukyu Island	Korea	New Delhi Belly	Indochinese refugees	French soldiers		
4,6				1	2				1	1		2		7
4,7,11				1										1
4,10		2		1		2							1 (e)	6
5				3		1								4
5,9,14				1										1
5,11				1										1
6		1		5		2	1		1	1	2	2		15
6,7		3		1		2	1							7
6,7,8				1										1
6,7,11											1			1
6,8,11							1							1
6,9,12									2					2
6,11	1	3				1								5
6,12							1							1
7	1	2	1		1		1				1	2		9
7,8	1			4		1			1					7
7,8,9				1										1
7,8,13						1								1
7,9						1								1
7,11							1			1				2
8					1						1	1		3
8,11							1							1

TABLE 1. *Distribution of* Paracolobactrum coliforme *strains isolated in the Far East**—Continued

"O" antigenic structure	Japan					Naval vessels		Diarrhea in U. N. Forces (other than in Japan)			Indochina		Others	Total
	Soil	Vegetables	Diarrhea in Japanese	Diarrhea in U. N. personnel	Marine camp outbreak	Crews, no diarrhea	Hong Kong	Ryukyu Island	Korea	New Delhi Belly	Indochinese refugees	French soldiers		
8,12				1										1
9				3										3
9,11				1		1					1			3
9,13				1										1
10				2			1						1 (d)	4
10,12									1					1
11				2	1		1	1	1		4	8	1 (d)	19
11,12				1		2	4							7
12				4		8	2		3			2		19
13						3	1					1		5
14				2		1	1							4
Further group	5	6	1	39	3	46	13	2	9	3	9	8	1 (a) 2 (b) 1 (c)	148
Total	9	22	19	180	26	198	56	8	40	8	24	48	29	667

*With 16 exceptions noted under (a) and (b).

(a) Isolated in California. (b) Type strain from Dr. Stuart. (c) From the Philippine Islands. (d) From New Britain. (e) From fomites.

3.—	2,3,7,11	2,11	11
4.—	3,4,5	3,4	5
5.—	3,4,6,11	11	
6.—	5,6,11	6,11	11
7.—	7,8,9,12	7,8,9	7,8

Serotypes 5,6,11, and 11 were isolated from the blood of an infant who died of septicemia, while the intestines yielded serotypes 6,11, and 11.

Because paracolobactra with stronger and weaker antigens are not infrequently found in the same specimen, a loss variation has to be suspected that is more intensive than in salmonellae or in shigellae. If salmonellae isolated from the same specimen are compared, and if differences in the antigenic structure are present, these changes are usually restricted to phase or form variation. In *P. coliforme* strains picked from the same plate, entire antigens or antigenic groups may be lacking.

This antigenic variation in *P. coliforme* may explain the large number of antigenic combinatiors encountered during the study. It makes the evaluation of the individual groups rather difficult. If, for example, only one colony with the antigen 11 is isolated from a specimen, it is not possible to determine if this is a strain which originated from one with antigenic pattern 1,11; or 1,2,11; or 2,3,11; or some other combination of factors. As an aid in evaluation of the antigens, we prepared table 2 to show the occurrence in all organisms that were studied of each antigenic factor considered separately. The material was grouped according to its source. Strains from United Nations personnel without diarrhea constitute the first column. The second column summarizes the antigens found in *P. coliforme* organisms isolated in Japan, Korea, and the Ryukyu Islands from United Nations personnel with diarrhea. The third column tabulates the strains from Indochinese refugees, French Foreign Legionnaires, and patients with "New Delhi Belly" under the heading, "Asiatic mainland." The fourth column concerns antigens of organisms cultured from patients with the "Hong Kong Dog." This grouping of the sources seems justified when movements of people and their possible contacts are considered in the light of military and political limitations.

If the five most frequent antigenic factors in table 2 are compared, the results are as follows:

In the cultures from United Nations personnel *without diarrhea,* antigens 1,2,3,4, and 5 are the most frequent. In diarrhea among United Nations patients, 1,2,3,11, and F; on the Asiatic mainland 2,4,6,11, and F; and in the "Hong Kong Dog" 2,3,4,11, and F were the leading antigenic factors.

TABLE 2. *Antigenic factors found in strains grouped according to source*

Antigenic factor	Number of strains harboring antigen			
	U. N. personnel		Asiatic mainland	Hong Kong Dog
	Without diarrhea	With diarrhea		
1	53	58	5	7
2	63	93	12	16
3	69	67	3	19
4	72	38	17	12
5	53	22	7	10
6	11	35	9	8
7	19	28	6	4
8	9	23	2	2
9	8	22	4	1
10	6	7	0	1
11	10	44	15	12
12	14	19	2	9
13	11	4	2	2
14	8	9	0	4
F	46	53	20	13
Number of strains examined from each source	198	254	80	56

F = Further groups.

This observation points toward the importance of the 11^+ antigens in diarrheas. The F group, being heterogenous, cannot be considered significant at this moment.

As far as *individual* strains occurring in the 123 antigenic groups are concerned, their evaluation is limited by the small number of strains in each group. The 10 groups with the largest number of strains were:

Antigenic structure group	Number of strains in group
3,4,5	61
1,2	32
2	28
11	19
12	19
2,3,11	18
3,4	17
3,6	16

6	15
1,2,3,4,5	12

Strains with the antigenic structure 3,4,5 are serologically identical with the strain 311 of Stuart. They were found in Korea and Japan, in diarrheas originating in Hong Kong, and aboard U. S. naval vessels, but not on the southern Asiatic mainland. The closely related group 3,4 differed from 3,4,5 by being isolated also from Indochinese refugees and from a French soldier. Group 3,4 may, however, be a loss variant of group 3,4,5. One further serologic combination 1,2,3,4,5 is of great interest in this connection. Members of this group were isolated from patients with diarrhea in Japan and in Hong Kong. Strains studied at the Kitasato Institute in Tokyo (not included in the tabulation) showed that this serotype was frequent in Japanese children afflicted with diarrhea.[9]

Group 1,2 was found in Japan, Okinawa, Korea, and in French soldiers. Serologically it is related to Stuart's types 111, 4411, 26711, and 31611. It may be the parent of group 2, or an intermediate in the variation of $1,2^+$ strains. Group 2 has been found in diarrheas in Japan, Hong Kong, Indonesia, and in one case of "New Delhi Belly." One has to consider it as a possible loss variant. The same holds true in regard to groups 11 and 12, which were rather frequent and were isolated from different geographic locations.

Group 2,3,11 was isolated chiefly from an outbreak of diarrhea in a military camp in Japan. Thirteen strains of *P. coliforme* with this antigenic structure were isolated from that outbreak, together with four of 3,11 structure and one with 11 antigen alone. One additional strain was typed as 3,4,6,11, and two as 4,6. Finally one *P. coliforme* was classified as 7 and one as 8. The study of this outbreak clearly demonstrated the antigenic variations occurring in *P. coliforme*.

Group 3,6, with one exception was isolated only in Japan and Korea; while group 6 appeared well distributed in Japan, Korea, Indochina and New Delhi. Group 6 may be, however, the last link in a chain originating from $6,7^+$; $6,11^+$; or any other group containing the 6 factor.

It is difficult to discover the source of infection in many a diarrheic outbreak. This task is even more difficult in paracolobactrum infections, because of their antigenic variations. Some insight into the circulation of these organisms resulted from a suggestion made by Col. R. L. Mason, who was commanding officer of this laboratory, that the teams investigating "Hong Kong Dog" aboard naval vessels collect samples from fomites which had been touched by crew members or by troops carried on the ships. *P. coliforme* with the antigenic structures 1,2; 1,2,3,4,5; 1,4; 3,4,5;

and 4,10 were isolated. These are related to strains found in man. Because the swabbing of fomites with subsequent culture for enterobacteriaceae proved to be a reliable method of determining the presence or absence of fecal contamination of fomites aboard ships (considering the finding of possible enteric pathogens and/or of *Esch. coli* as indicators of such contamination), this method was used in subsequent studies of diarrheic diseases.

The investigation of *P. coliforme* organisms isolated from vegetables has not as yet yielded as much sufficient information as is needed. The relatively frequent occurrence of organisms with factors 6, 7, and 11 seems to be significant if subsequent examination confirms this trend in the distribution of serogroups of *P. coliforme* on vegetables. Further study of fomites and foods is indicated, for the clarification of the role of these carriers of *P. coliforme*.

With regard to the disease caused by these organisms, paracolobactra follow the general trend of enterobacteriaceae by causing more severe symptoms in the very young, the very old, and in persons ill with other diseases. The case of *P. coliforme* septicemia mentioned earlier in this report points to the greater pathogenicity and invasiveness of *P. coliforme* in infants. According to Japanese investigators,[9] *P. coliforme* strains are causing serious difficulties among Japanese infants and young children. In the armed services, where young and healthy persons predominate, paracolon diarrhea is usually of short duration. It frequently evades attention because of its short, relatively mild course and usually prompt response to antibiotics. The number of organisms ingested no doubt affects the severity of the diarrheal attack in each case. Disruption of unit function is seldom caused by paracolobactra in the Army. The situation is different, however, in the Navy and Air Force, where even short-time incapacitation of a man performing a highly specialized technical task, such as piloting an airplane, may be of serious concern. While the physically strong adults of the armed services are less liable to suffer from paracolobactrum diarrhea, consumption in distant "ports of call" of unusual dishes and drinks, including uninspected food, increases the probability of intestinal infections.

So far as is known, all recognized group outbreaks in the military forces have had the characteristics of food-borne infections. Therefore, the chief measures which may help to lower the incidence of paracolobactrum disease are the same as apply to other food-borne infections; *i. e.*, good sanitary practice in food service, and the avoidance of unapproved foods and eating places.

SUMMARY

Six hundred and sixty-seven *P. coliforme* organisms were studied. Their antigenic structure showed great variations, presumably

because of the frequent loss of antigenic factors. There seems to be some difference in frequency of occurrence of various antigenic factors according to geographic origin of the examined materials. The fact that *P. coliforme* was isolated in large numbers from many patients in whom no other pathogenic or potentially pathogenic strains were found, confirms the statements of previous authors that these bacteria should be included with other paracolobactra which may cause diarrhea and other disease in man.

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RESEARCH TODAY

Gone are the days of the lone researcher, pouring over retorts in the barn or the attic. Modern research is a matter of teamwork, in streamlined laboratories with chrome-plated gadgets. A single piece of modern research equipment may cost as much as a busy practitioner's annual gross income. Perhaps some new Curie, Pasteur, or Koch may flash across the scientific firmament in the future, a lone worker with shabby equipment. But the odds are against it. The single, dedicated worker in his basement laboratory has probably gone the way of the one-horse shay, the little black bag, and the elegant four-ingredient prescription.

—EDITORIAL
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FUNCTIONAL ASPECTS OF NASAL PROSTHETICS

HAL B. JENNINGS, Jr., *Lieutenant Colonel, MC, USA*
JOHN H. TENERY, *Lieutenant Colonel, MC, USA*
AELRED C. FONDER, *Captain, DC, AUS*

THE successful use of a simple device which improved the comfort and respiratory physiology in one of our patients prompts this presentation. It is offered with the hope that its modification and use in other applicable cases may be of benefit to patients.

Slight modification of a commercial crystal-type cigarette filter was used as an adjunct to an acrylic nose prosthesis to effect the improved physiology and comfort of the patient during his period of pedicle tissue preparation for permanent nose reconstruction. Due to the gaping defect in the anterior nasal passage (fig. 1), caused by the traumatic loss of the nose, the entire physiology of the nasal airway was deranged. The absence of nasal vibrissae prevented effective filtration of dust and foreign material from the inspired air. The loss of the nares disrupted normal circulation of air through the nasal cavity, caused loss of the warming and humidifying effects of turbulent air flow, and in turn caused the patient much discomfort due to irritation and drying of nasal and pharyngeal mucosae.

To improve cosmesis during the pedicle-tissue preparatory phase of the reconstruction, an acrylic nose prosthesis was constructed (fig. 2). This alone relieved some of the symptoms referable to mucosal dehydration. At the patient's suggestion however, an unmodified plastic cigarette filter* (fig. 3A) was cemented internally into each nostril opening of the nasal prosthesis. Because the impedance to air flow caused too much respiratory effort for adequate air volume, the filter was cut in half, the amount of filtering crystals reduced, and the plastic ends of the filters were replaced by nonrusting metal screens (fig. 3B). These simple modifications (fig. 3C) facilitated air flow and effected the stoppage of symptomatic discomfort formerly experienced by the patient. The crystals in the filter were effective in removing dust and airborne irritants. The angle of the filter tubes produced a more normal physiologic circulation of air (fig. 4, A and B)

From Brooke Army Hospital, Fort Sam Houston, Tex.
*De-Nicotea crystal filter by Dunhill.

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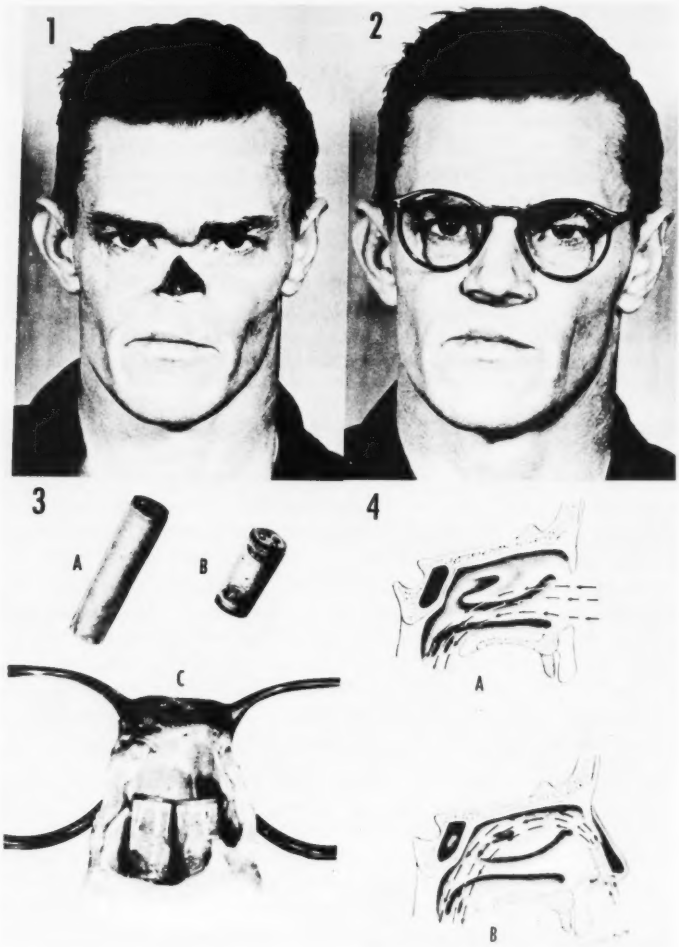

Figure 1. The patient after preparatory surgery to open airway. Figure 2. Patient with acrylic nose prosthesis as temporary cosmetic aid during pedicle tissue preparation. Figure 3. (A) *Unmodified filter.* (B) *Modified filter—shortened, fewer crystals, and metal screens in ends.* (C) *Reverse side of prosthesis with modified filters in place. Figure 4.* (A) *Diagrammatic air currents in nasal passage without prosthesis.* (B) *Diagrammatic air currents in nasal passage with prosthesis and filters in place.*

through the nasal passages, allowing greater warming and humidifying of the inspired air.

With a little imagination, these filters could be adapted for use in other patients requiring the directional and filtering effects.

REFUGEE PROBLEMS IN VIETNAM

THOMAS A. DOOLEY, III, *Lieutenant (junior grade) (MC) USNR*

IN JULY OF 1954, after the Geneva Treaty, a conference of French and Vietnamese officials was held in Hanoi, the ancient capital of Tonkin, Indo China. Here the French and the Vietnamese governments requested that America assist their own forces in evacuating from Tonkin all the refugees who might want to live in freedom south of Geneva's 17th parallel. This freedom of movement was to be permitted according to the Treaty.

America agreed and in the second week of August the U. S. S. *Menard,* the U. S. S. *Montague,* and several other ships of Task Force 90 sailed into Baie d'Along, 3 hours down river from the port city of Haiphong. By 1 September 1954 over 35 ships participated in the evacuation.

Under the direction of Commander James A. Grindell (MC) USN, Force Medical Officer, Task Force 90, and under the command of Commander Julius Amberson (MC) USN, a Preventive Medicine and Epidemiological Unit was organized at Haiphong. Its mission was to establish liaison with the French and Vietnamese health authorities and to prevent the spread of epidemic diseases to American vessels involved in this "Passage to Freedom."

According to the fourteenth clause of the Treaty of Geneva, anyone who lived in Communist Vietminh territory north of the 17th parallel who desired to move to free Vietnamese territory south would be allowed to do so, and vice versa.

All the area north of the 17th parallel was in the hands of the Vietminh save a perimeter around Hanoi and Haiphong, some 40 miles in length and 45 miles in width. This perimeter shrank on successive dates until, at the time of this writing, all save the city of Haiphong and its immediate suburbs was in the Vietminh control.

In the months of August and September 1954, thousands of refugees flowed daily to the huge refugee camps in Haiphong.

From U. S. Naval Hospital, Navy No. 3923, FPO, San Francisco, Calif.

This article covers the period from 15 August to 31 December 1954, during which time the author was concerned with the evacuation of refugees from the north of Vietnam. He was first a member of, and later in command of, Task Force 90's Preventive Medicine and Epidemiological Team stationed in Haiphong, Vietnam, Indo China. The evacuation continued until 15 May 1955, when the Vietminh took over Haiphong.—*Editor*

Then, as the Vietminh controls became tighter, the numbers became smaller and smaller.

The French Navy, with the co-operation of the U. S. Navy, did some heroic off-the-beach rescues, and in one week, for example, brought over 18,000 people from the area of Bui Chu just south of Haiphong, behind the Bamboo Curtain, to their freedom here in Haiphong. The refugees then became escapees. In November 1954 the numbers again swelled. Over a half a million refugees passed through our camps, and 189,316 were transported south on American ships. There were 109 births and 53 deaths on the United States ships. These refugees were desolate and miserable, depicting an eloquent picture of despair, yet their faith and spirit and belief in righteousness was outstanding. Task Force 90 did a noble transportation job.

In the last week of August 1954, the first refugee camp was completed. This was called Camp de la Pagode, and was built by the United States Foreign Operations Mission in co-operation with the Military Assistance and Advisory Group, with the medical planning and administration done by this unit in liaison with Haiphong Public Health Services. The French Army furnished the manpower.

EPIDEMICS IN PAST YEARS

As a guide to what could be expected in the way of epidemic diseases, Vietnamese public health statistics and French military statistics were also thoroughly reviewed. From these statistics, it appeared that the diseases most to be feared in epidemic proportions were cholera, dysentery, typhoid, and plague; but during the operation none of these were seen in any significant numbers. However, cases of malaria, tuberculosis, trachoma, beriberi, and other common tropical diseases were seen by the hundreds.

EPIDEMIOLOGICAL CONTROL

For six weeks the Fleet Epidemiological Disease Control Unit No. 2 (FEDCU) from Japan was incorporated in the Preventive Medicine and Epidemiological Unit. This unit collected specimens, took innumerable photographs, classified rodents and other animal life, made peripheral blood smears, and did an exhaustive study of the city water works and general sanitation of the area.

INOCULATIONS

Under this unit's supervision, Vietnamese Public Health nurses vaccinated against cholera and smallpox almost all of the refugees in the camps before they were put aboard American vessels. The vaccines were obtained through the U. S. Foreign Operations Mission.

Twenty-four large boxes of supplies, made up by U. S. Foreign Operations Mission and given to Public Health, were distributed to the Control Teams, consisting of Vietnamese doctors, nurses, and midwives, who traveled on the United States ships carrying the refugees south. The Control Team would then fly back north and repeat the trip on another ship. These boxes contained sulfadiazine, aspirin, APCs, chloroquine, a small amount of DDT, minor surgery equipment and solutions, boric acid, swabs, cotton, dressings, hexylresorcinol, Brown mixture tablets, and sodium bicarbonate. They were resupplied by American Aid in Haiphong.

CAMP DE LA PAGODE

Camp de la Pagode was the first camp to be constructed. It started as a 100-tent camp in the second week of August 1954 and grew to a total of 149 Army-style, 20-man tents. Its daily census ranged from 2,000 to 12,000, but the mean was about 7,000.

The tents were arranged in rows of 12. There was a broad roadway through the camp which was situated 1 mile from the highway, 5 miles from the city of Haiphong. The camp was surrounded by rice paddies. Electricity was rigged in November. There was an elaborate set of drainage ditches running on all sides of each tent, joining and flowing on each side of the roads. These functioned well and kept the tent camp from flooding during the monsoon season in August and September.

The broad fields and paddies surrounding the camp were used as the latrines. About once a month we would spray these fields with a 1 percent solution of lindane (1, 2, 3, 4, 5, 6-hexachlorocyclohexane), 15 gallons to the acre.

The camp site itself was sprayed once weekly with lindane. This took care of the fly problem adequately, even during the hot, damp months.

There was a medical sick call tent and two hospital tents which were full most of the time. Only patients with serious diseases were treated in the hospital tents. In the beginning of the operation the Vietnamese Public Health furnished a doctor at these sick calls every other day, and in the interval the very capable Vietnamese nurses would run the sick call. By 1 December, however, almost all of the Public Health doctors had moved south and the Preventive Medicine and Epidemiology Team doctor held sick call every other day.

As the main mission of the unit was to prevent the spread of epidemic diseases, only those illnesses of an acute or epidemiologically dangerous nature were treated by the unit physician. There were as many as 200 people at 1 day's sick call. Common

decency, however, demanded that one be generous with the oral penicillin as well as the soap, which proved excellent in the cleaning up of the severe staphylococcus infections of the scalp that are so prevalent in Tonkin.

The respiratory diseases which were high in percentages were handled with terramycin (brand of oxytetracycline) and the Brown mixture tablets. Dysentery was assumed to be amebic and usually in the chronic stages. In acute stages it was treated with aureomycin. Vitamin-deficiency diseases were common, beriberi being by far the most prevalent. Multivitamins were given, and although the refugees only stayed in the camps for a week or so before being evacuated, a definite improvement could often be seen. Perhaps we do not realize the efficacy of our mundane prescription, "Multivitamins, tablets one, daily."

Epidemic diseases of cholera, typhoid and plague, and yellow fever were not seen. Fulminating diarrheas were seen in three children, who were living in the yard of a small mission in Kien An (about 10 miles from the city) while awaiting other members of their families to escape from behind the Bamboo Curtain. The unit doctor was called by the parish priest. As the French laboratory units had gone to Saigon, and the City Hospital of Haiphong had few facilities, an exact diagnosis could not be made. Based on the rapidity and extent of the dehydration, the muscle cramps, and the general severity of the disease process it was assumed to be cholera. The treatment consisted of fluids given subcutaneously, morphine, and sulfaguanadine. One child died, and the other two made uneventful recoveries. The particular hut on the mission grounds in which they were living was burned, and the surrounding area given a thorough spraying with two percent lindane. The adjoining latrines were filled with lime, and later sprayed with lindane. No further cases of diarrhea were noted. This was the closest thing to an epidemic disease seen thus far in the Indo China evacuation.

Helminthic infestations were present in over 90 percent of the refugees. A cursory glance into a latrine area would reveal a pathologic museum of intestinal worm specimens.

Fungus diseases especially due to tinea involving both scalp and glabrous skin, and usually complicated with a secondary infection, were frequently seen. Clinically typical cases of favus were commonly seen in the children.

Yaws, especially of the face and the legs, was seen occasionally. A few injections of penicillin, plus local measures, brought about excellent results.

The Fleet Epidemiological Disease Control Unit laboratory found mosquitoes of the genus Aëdes, and public health statis-

tics indicated that there had been proven cases of dengue in past years, but it was my good fortune never to have seen any. No rickettsial infections were seen; but body lice were common, and the dusting of all refugees with DDT was directed.

The Culex mosquitoes were found, though only a few cases of filariasis were seen. Filariasis is more common in the mountain areas than in the Tonkin delta from which most of our refugees emigrated.

Malaria due to *Plasmodium vivax* was a common cause of death among the children in the camps and on the ships. Many had a fulminating fever and marked splenomegaly but no other symptoms. The vector was forever present in Tonkin, and especially bad in the rainy seasons. Laboratory examinations by FEDCU of peripheral blood smears proved *P. vivax* more common than *Plasmodium falciparum* or *Plasmodium malariae* in cases studied in the Haiphong area.

WATER PURIFICATION

At Camp de la Pagode, water was taken from the nearby rice paddy and purified for consumption by the refugees. During the months of October and November as much as 12,000 gallons a day were purified. The optimum was 1 gallon per refugee per day.

We used the gasoline engine-driven portable 15 GPM Wallace and Tiernan Water Purification Unit, 1940 model, available in the Marine Corps Supply Catalogue. Except for very minor repairs they worked daily for the 137 days and will probably continue their fine record. If machines could be awarded letters of commendation these two should have them.

The principle was to lift water from an available source, run it through a sand filter, through two chemical feed tanks, one with alum, the other with soda ash, and finally through a hypochlorinator which feeds chlorine solution to a residual count of one part per million. The water was put into a 3,000-gallon, rubber, storage tank where it was allowed to settle, and then pumped into a second tank where the water was clear and potable. A hose and a spigot completed the machinery.

Some of the difficulties encountered were the following: the particular paddy from which the water was lifted had to be fenced off with barbed wire because the refugees would wash their feet, food, and livestock in it. One morning the whole rice paddy was black, and there was no other discoloration in any of the adjacent paddies. After much concern and investigation it was discovered that the cause was a vegetable dye that a peasant had used to color her clothes black for the winter. She dumped the concentrated solutions into the rice paddy when she had finished with them.

On several occasions our rubber tanks were slashed with a knife, believed to be an attempt by Communist sympathizers to foil our work. The Vietnamese were able to sew these and vulcanize them with some sort of asphalt. We finally erected a barbed-wire fence around the water tanks and posted a 24-hour Senegalese French guard. No further difficulties were encountered.

CAMP SHELL

In August, Camp Shell, a small camp for the overflow of refugees from Camp de la Pagode, was built near the site of the latter. It had a capacity of 2,000. Construction and sanitation were identical. A 3,000-gallon, rubber storage tank was erected, and 2,000 gallons of potable water was delivered daily from the City Service of Haiphong via a leaky water trailer.

CAMP CEMENT

In the first weeks of December it became obvious that another camp would have to be constructed. A new camp was built and christened Camp Cement, because of its location near a large cement plant. On the day of its completion 3,500 refugees moved in.

There were 64 tents of the same type as in the other two camps. The daily census was around 4,500. This camp was in better condition than de la Pagode because the ground was higher and drier.

Three latrines, 20 feet long, 5 feet deep, and 3 feet wide, were constructed, and edged with pierced steel plating and a 5-foot apron of crushed stone. A 5-foot high, canvas windbreak was built around each latrine and painted with 2 percent chlordane (1 gallon to 400 square feet). Seat space was no problem as the natives squat rather than sit.

The latrines were on the downwind side of the camp, 200 yards from the nearest rice paddy and 500 yards from the water tanks. Because there were always a few inches of water on the bottom of the latrines, crude oil was poured on twice weekly. Once a week lime was poured in to destroy the feces, and the whole area was sprayed with a 2 percent solution of lindane (1 gallon per 300 square feet). This helped to control the ever-present flea, fly, and mosquito problem. Once a week the three camps were given a general spraying with a 1 percent solution of lindane, 15 gallons to the acre.

The tents were floored with steel plating, on which the natives put their straw mats. The tents were dusted with 5 percent DDT powder from time to time. In certain dirty parts of the camp such as the garbage-disposal areas 5 percent DDT in kerosene was

used weekly. Aerosol bombs were used in the medical tents when needed. As in the other camps, Camp Cement had two medical tents, one for hospitalization and one for sick call.

Areas were marked for waste disposal; signs were put up around the camp to point them out, and three or four times a day the people were reminded by loud-speakers to use them. Nevertheless, only about 50 percent bothered to use these areas. Because the problem was extremely severe in the hot summer months, a solution was attempted, but in oriental lands such solutions are seldom achieved. The tradition is just to throw the garbage behind the tents. The fact that this happens to be the front of someone else's tent seems unimportant to the inhabitants of both tents concerned.

Rodents were present but they did not create a problem. Means were not available for a thorough deratization. As each ship was relieved, it had a thorough deratization at its home port. Drainage ditches were put around each tent and around the camp. From time to time, when the tides were extremely low and the corresponding level of the rice paddies low, the water in the ditches became stagnant. During these times, however, frequent spraying prevented the fly problem from becoming overpowering.

Two large 3,000-gallon rubber water tanks were set up, and the city delivered water to one tank. Because the water was of questionable purity, it was run through the filter and the hypochlorinator and then put into the second tank. A hose and spigot allowed the refugees to draw it as needed. The tanks and machinery were enclosed by barbed wire and a guard was posted.

The Vietnamese government took over one tent and set up Army recruiting offices. About 100 men would join daily. There were other tents for the passing out of American aid, which consisted of 600 grams of rice per day per refugee, mats, firewood, vegetables, and blankets. The United States Information Services passed out information pamphlets by the hundreds. Posters throughout the camp indicated the location of various key places and disseminated information on general subjects.

The general spirit of the camp was good, and the co-operation between the Vietnamese administrators and this unit was excellent. From time to time the problem of refugee administration became very difficult, but it was always resolved to the satisfaction of both parties, because the common interest was the rapid evacuation of the refugees of Tonkin.

EMBARKATION SITE

The refugees were dusted with DDT at the embarkation site on the river before they were put aboard French LSMs (landing

ship medium) and taken down the river to the American transports anchored in Baie d'Along.

Five men handled the DDT guns, which were attached by a hose to a compressed air machine, and 5 percent DDT powder was used. The first man would dust the refugee's head thoroughly, the second the inside of his hat and some of his baggage; the third would push the gun up the front of his shirt, the fourth up the back. The fifth man would attempt to get the gun down the front of his pants. This usually met with difficulty, but because the Vietnamese have sparse pubic hair it was not considered essential. The unit medical officer observed all refugees as they came down the line to prevent any refugee with obviously serious or contagious disease from boarding.

The Vietminh mentioned our "DDTing" in their anti-American propaganda, telling the people that it was highly poisonous and that the Americans were doing it to harm them. As a consequence the refugees, even after spending several days in the camps, were still extremely apprehensive at the embarkation site.

Representatives of various charitable organizations of the Vietnamese government were at the embarkation sites. The refugees were given about one dollar's worth of piasters, a loaf of bread wrapped in a propaganda leaflet, blankets, and diapers for the infants. Public Health had a mobile medical ambulance, and emergencies were treated by the Vietnamese nurses and this unit's doctor.

Embarkation was carried out two or three times weekly in August and September. Then it slowed down, and now in December the refugees leave at the rate of 6,000 every 7 or 8 days (on American ships).

SUMMARY

Observations and problems encountered in 5 months of working with the refugees of Indo China are presented. The construction, sanitation, and epidemiologic aspects of the three large refugee camps are discussed. Pre-embarkation delousing, vaccination, and medical observation are presented. It is hoped that this article may be something of a guide for military physicians who may find refugee movements within their ken in the future.

The tears of the red, yellow, black, brown, and white man are all the same.—Martin T. Fischer

PROBLEMS FACING MILITARY MEDICINE

HONORABLE DEWEY SHORT

A short excerpt from this speech was quoted in an article entitled, "Medical and Dental Officer Career Incentive Program," which appeared on pages 1469 to 1475 of the October 1955 issue of this Journal. *Because of requests for the full text of the speech, and with the kind consent of Congressman Short, the complete speech is being reprinted from the* Congressional Record.—Editor

Mr. Chairman, ladies and gentlemen, it is with some trepidation that I appear before this distinguished gathering today. I have tremendous respect for doctors, not only doctors of medicine, doctors of osteopathy, doctors of philosophy, doctors of dentistry, but also for doctors of divinity. But rarely in my life have I appeared before a group who quite recently would probably have very cheerfully cut my throat—and who possess the skill to do the job neatly.

I am referring, of course, to the recent extension of the Doctors' Draft Law which passed the House and was signed into law on June 30.

In my own small way, I undoubtedly have contributed to the potential displacement of some of you for a 2-year period.

It is an unfortunate, discriminatory piece of legislation, this Doctors' Draft Law, but I want to assure you that it is absolutely essential.

Perhaps it is the penalty you share for belonging to a very select organization. As physicians and surgeons you hold an extremely responsible position in our economy. You have studied long and hard: you have met the best competition and only the finest survive.

And because your services are so much in demand, it was necessary for us in the Congress to enact legislation to compel you to serve in the Armed Forces even though you are beyond the regular draft age.

Now I want to discuss this subject with you today because it is important not only to you and your colleagues, but also to the civilian population and our armed services.

Statistically, we had no choice but to extend the Doctors' Draft Law. The draft age has been reduced to 46, from the old age of 51, and from what I can gather from the facts that have been presented to us, doctors will be taken up to that age during the next 2 years.

Read before the Postgraduate Medical Assembly of South Texas, Houston, Tex., 19 July 1955.

We eased the situation with regard to physicians and dentists who are now over 35 and who previously applied for a commission in the medical or dental corps and were rejected for physical reasons, but we could not make that provision retroactive for those now serving on active duty. That also is discriminatory—for the doctor who was able to stay out of service, and who meets the criteria of this amendment, will not have to serve, while the doctor who is now serving on active duty who otherwise could have met the criteria, must remain on active duty until he completes his obligated period of service.

Wherever we turn in this whole manpower problem, we face inconsistencies and discrimination; even the regular draft act is discriminatory. Some must serve and others are deferred. Those who are healthy must go; those who are disabled remain behind. Those who are engaged in essential industry are deferred; those who are not, must serve.

This whole idea of compulsory service is repugnant to me and always will be, but I am also practical enough to realize that our Nation must possess an armed force capable of defending this Nation should that occasion arise. And the health of our armed services must be paramount in our thinking.

One of the serious problems that we face in this Nation is a shortage of doctors; and as far as I am concerned, there is a maldistribution of practicing physicians.

I do not believe that our medical schools are adequate in size to graduate the number of doctors that our economy requires. And unfortunately, since we are all human beings the natural tendency of many physicians is to go to larger cities where the patients are in a small area and where the level of income is high enough to justify charging reasonable fees.

That means that we have areas in this country that are inadequately staffed with doctors. And as far as I can see, that situation will remain with us and grow worse unless we take positive steps to increase the input of medical students and the output of medical school graduates. I would like to see that accomplished with as little Federal interference as possible.

It is not my purpose to deliver a sermon, but I would like to give you some of my ideas with regard to this whole problem of medical care.

Obviously, we cannot continue the doctors draft law for an indefinite period. Therefore the armed services must find a procurement method other than the doctors draft law.

Now so long as we have the regular draft law in effect we will be able to obtain a fair share of medical school graduates, since anyone who is deferred for any reason under the regular draft remains liable for induction up to age 35. But we can't depend entirely upon medical

school graduates as a source of doctors for our armed services because then we would be depending entirely upon young men who have just completed their internships. The armed services need specialists and experienced physicians just as much as any other group of people. But we are not attracting experienced physicians and specialists in our Armed Forces on a career basis. And that calls for a little self-analysis.

Why aren't we getting more doctors to make a career of the armed services? Is it economic?

Yes, partly. It is a little hard to compare a major's pay with the $15,000 net income annually of the average practicing physician in the United States.

But I don't believe it is entirely economic. Pay is not everything. I think it may also involve the dignity of the profession, the constant changes of station, and perhaps to some extent, the unintentional subjugation of professional initiative.

I am convinced that the average doctor has a unique personality of his own; a rugged individualist—if you will. He has to possess that sort of personality, otherwise he would never have had the courage and stamina and determination to spend 4 years in college, 4 years in medical school, a year of internship, and 2, 3, and 4 years in residency training before he considered himself qualified to practice medicine.

And I suppose the average physician is not willing to enter into a form of regimentation in which his own personal attainments and ability will not be rewarded in proportion to his achievements. I believe that, too, may be a factor in this medical procurement problem in the armed services.

I don't know the full answer, although I can assure you that it is being studied carefully with a hope that some solution can be found. Basically, the medical situation in our armed services is one of supply and demand. So long as the demand exceeds the supply, the attractiveness of service life will undoubtedly take a back seat to the normal civilian life where the physician is his own boss.

The ultimate solution to the whole problem of supplying doctors for our Armed Forces and also for the civilian economy is a substantial increase in the number of doctors.

While the doctors draft law was under consideration in the House and in the Senate, Members of Congress were besieged with telegrams and letters from doctors urging the elimination of the doctors draft law. The contention was made that if dependent medical care were abolished and all other persons now entitled to medical care from service doctors were denied this benefit, there would be no need for a doctors draft law.

Well, I want to discuss that subject because it is of fundamental importance to you and to the Armed Forces. The number of individuals

who are theoretically entitled to medical care from service doctors is large. But when you compare the actual statistics of medical care furnished to persons other than service personnel it soon becomes apparent that the existing legal entitlement is not being abused. As a matter of fact, if all medical care were abolished for all personnel now entitled to medical care from the armed services other than armed services personnel and their dependents, we would only be able to eliminate about 40 of the 10,000 physicians now serving on active duty with the armed services and the Public Health Service. And if we abolished all dependent medical care in the United States, we would only eliminate an additional 581 doctors from the armed services and the Public Health Service.

The next contention was that the ratio of physicians to armed services personnel is unrealistic—too high. It is now approximately 3.044 per thousand and you will hear statements made that this is so much greater than the civilian population that it obviously can be substantially reduced.

Well, ladies and gentlemen, medicine in the armed services is not confined solely to treating servicemen who are ill. Sometimes we all overlook the very basic reason that we have an Armed Force. We constantly strive to impose upon our armed services the same business standards that apply to the United States Steel Corp., General Motors, Humble Oil, and countless other groups in the country. But you can't compare a producing corporation with an insurance policy. Our Armed Forces exist so that those corporations and the people who work for those corporations, and the doctors and dentists and veterinarians, and small-business owners, and farmers, and railroad engineers, and students, and mothers and fathers, and everybody else in this United States, can continue to live in freedom. Of course, maintaining our Armed Forces is costly. Fantastically expensive. And, of course, there is waste. Of course, there is duplication, unnecessary transportation, administrative mistakes, poor decisions, bad buying, but we are dealing with an organization which employs almost 5 million people, an organization that spends 65 cents out of every Federal tax dollar, an organization that spends between forty and fifty billion dollars annually, an organization whose expenditures exceed the income of 18 of the largest corporations in the United States.

The Armed Forces isn't a business operation. It exists for the sole purpose of preserving this Nation. And in order to preserve this Nation we have to have men mentally and physically fit to perform all types of duty.

We have to have doctors who know how to prepare for the medical support of an amphibious operation. We have to have doctors who know all of the medical problems of logistical support of a land operation; we have to have doctors who are familiar with the human physical limitations in the problems of space; we have to have doctors who are

experts in field sanitation, preventive medicine; and all of our doctors must have some conception of what a military organization is, how it functions and what their responsibilities would be if they were called upon to take command of a medical battalion.

So, all the time of a doctor in the Armed Forces is not confined to the treatment of people who are ill; perhaps some doctors spend most of their time treating patients, but when that doctor is serving in that capacity another doctor is studying a supply problem, or a study involving the results of underwater demolition, or the proper way to treat victims of nuclear warfare.

So, it is not quite fair to our armed services to compare the ratio of physicians to the civilian population and then conclude that the ratio in our armed services should more nearly approach that ratio. The problem in our Armed Forces is to keep our people healthy and not wait to treat them after they are sick.

I am not trying to defend poor administration, for I would be the first to admit that there are undoubtedly a few places in the Armed Forces where improvement can be made in the proper utilization of physicians and their skills. And I can fully appreciate how a pediatrician feels when he is called upon to leave his own practice only to end up in a dispensary treating the children of service personnel. And that, of course, leads me to the various problems of dependent medical care.

Now, traditionally we have provided, on a space and facilities available basis, medical care to the dependents of service personnel. But I don't know of anything that would more adversely affect the morale of our Armed Forces than to eliminate this entitlement. On the other hand, it is obvious that we cannot continue in good conscience to draft individuals and ask them to treat the dependents of our service personnel. The number involved is not great—581 is the approximate figure, but even if we eliminate 581, that would be 581 less doctors over the age of 35 who would have to be ordered to active duty. So there we are on the horns of a dilemma. Can we jeopardize the morale of our Armed Forces to the extent of eliminating dependent medical care in order to alleviate to some extent the situation with regard to the drafting of doctors over the age of 35?

Well, obviously the answer for the next 2 years is that the Congress was not willing to jeopardize the career attractiveness of many thousands of experienced men in order to reduce to just a small extent the number of physicians who will be required to serve in our Armed Forces who are now over the age of 35. But we recognize the fact that we must find a solution to dependent medical care. Obviously, we are again on the horns of another kind of a dilemma. For if we abolish all dependent medical care in the Armed Forces, then many of the physicians who now are willing to stay in the Armed Forces until reaching retirement age will leave, since the present diversification

of their practice may well be reduced to such an extent that they will prefer to leave the armed services and surrender the years of service they have built up toward retirement.

The average service doctor in a period of several years of service will treat service personnel who are basically healthy—perhaps an appendix now and then, a few bad colds, pneumonia, broken arms, broken legs, perhaps now and again a case of tuberculosis or a heart condition. But if the service doctor is treating just service personnel, he is not going to have much experience in gynecology, pediatrics, geriatrics, and many of the other types of medicine that are found in younger or older age groups.

So, what is the answer to that problem?

I am not sure that I can give you the answer, although I can give you a few personal observations. First of all, I think it is incumbent upon us in the Congress to adopt some type of group health-insurance program. In this way the dependent will be assured of medical care by civilian physicians even though the dependent is separated from the service member and in an area where no service facilities are available. On the other hand, unless some adequate program can be worked out in overseas areas, the dependents will continue to expect treatment from American doctors. It is possible that this can be worked out on a contract basis, but in some areas the only doctor available will be a service doctor, and he will be expected to treat dependents as well as service personnel.

Now whether this group program will supplement the present system or be a substitute for the present program, is the question. I would suspect that unless some method can be found to procure more doctors for the Armed Forces this system, if adopted, will at least for the time being, have to be a substitute rather than a supplement to the present system.

If we procure more doctors from the civilian economy on a career basis, at least we will eliminate the readjustment necessary in local communities throughout the Nation where practicing physicians are called into the service. In other words, if a doctor on his own initiative decides to make the service a career, his patients will usually have sufficient advance notice to make all the adjustment necessary, but when a doctor is taken from a community for a 2-year period with the full intent of returning to that community, there is often a void that cannot be filled. And at that point, the civilian community suffers.

If dependents are in an area where there are civilian physicians available and if they can go to civilian physicians under a health insurance program, that will ease the situation, to a very limited extent, but to some extent with respect to the number of doctors required in uniform.

On the other hand, it will give the dependent a benefit that she does not now enjoy and that is a year-round entitlement to medical care and not just on a space and facilities available basis.

To me, it is the only practical solution to the immediate problem and yet we have had no experience on this large a scale upon which to base such a program. While it is easy to criticise the Department of Defense and the Congress for failure to take action on this problem now, I think from what I have said here today you can see some of the ramifications. If we abolish all dependent medical care, we reduce the attractiveness of service medicine. If we continue to draft doctors, we not only disrupt the individual doctors, but in many cases, the local community in which he is practicing.

We must solve this medical problem in the armed services, not only for the immediate future, but for the years ahead.

I want to mention that considerable progress in medical manpower utilization has been made by the Assistant Secretary of Defense, Dr. Berry, and his assistant, Dr. Cushing, with the cooperation of a medical advisory committee and I am convinced that there is today a much better utilization of medical personnel than ever existed before. Some further progress can be made but I am afraid that insofar as the number of doctors required is concerned, we have just about reached the minimum.

I mentioned earlier that I considered the average physician to be a rugged individualist. I realize that that may be an unpopular term in this present day and age. Perhaps it is wrong to depend entirely upon one's self for a livelihood; perhaps I am living in the dark ages, but I cannot help but feel that all of the notable achievements of this century, and the past centuries, can be attributed to men and women who felt an obligation to their nation, their families, and themselves. They did not feel that being born entitled them to dependence upon the nation for a livelihood and for the better things in life.

We have become an extremely security-conscious people in the past few years and while much progress in social fields has been made, I sometimes wonder if it is not being made at the cost of the loss of individual initiative. And yet some of the social gains have been brought about by necessity, as well as public demand.

And very possibly, the next large field will be that of medicine.

I know it is unnecessary for me to tell you that socialized medicine, or any other name that you may wish to call a program of free medical care, is on the horizon. I can think of nothing that would do more to stop the progress of medicine than for this Nation to engage in a program of national socialized medicine. On the other hand you, as doctors, have made this Nation health conscious; you have stressed medical examinations, early treatment, danger signs, annual X-rays, and as

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a result you have made every person in this country extremely aware of the necessity for prompt and adequate medical care. As a result the health of the Nation has prospered. The average age of men and women of this country has increased and this in turn has increased the national income. But having started this very desirable awareness of the need for proper medical treatment, it is incumbent upon you as private citizens, as advocates of the free enterprise system—yes, as members of a capitalistic team—to meet those demands through the free enterprise system. If that demand is not met by you as private practicing physicians, or by you as groups of private practicing physicians, then it will be done for you by the Federal Government.

That is the history of this Nation and nothing you or I can say will stop it. It is only what you and I do to fill the needs of the people through the free enterprise system that that system will continue to exist as we know it.

It is for you to decide as leaders in your communities, as men respected and loved by your patients, your friends, and your neighbors, as to where and how and when we are going ahead. It can be done by direction of the Federal Government or it can be done through the free enterprise system and the cooperation of the Federal Government, but as sure as I am standing here today, it will be done.

You will have to make the choice—and I believe I know what your choice will be.

THE FUTURE OF MILITARY MEDICINE

If the medical profession is responsible for more and more people living a longer and longer time, as seems irrefutable, then would it not appear to devolve squarely upon the medical profession to lend major assistance in rendering areas of limited habitability and productivity more habitable and more productive? Military medicine, I think, occupies a position of particular advantage for affording valuable service in this regard and I believe it will so serve. I believe that those who come after us in tomorrow's vintage will advance the causes and interests of military medicine as those presently entrusted with calling the signals have striven to do, and the response they will receive will, I am sure, be equally gratifying to them as it currently is to us.

—LAMONT PUGH, Rear Adm. (MC) USN
in *Military Surgeon*
p. 34, Jan. 1954

Clinicopathologic Conference

Walter Reed Army Hospital, Washington, D. C.*

CHEST PAIN AND DYSPNEA

Summary of Past Clinical History. A 37-year-old veteran was first admitted to an Army hospital as an emergency patient after having been transferred from a civilian hospital with the diagnosis of an "acute abdominal condition." His illness had begun 3 days earlier when he developed epigastric pain without radiation, pounding of the heart, nausea, and vomiting. Although the pain and nausea, unrelenting during the 3-day period, did not allow him to sleep or rest, he continued his activities. He eventually collapsed and was hospitalized.

His past history revealed a 6-year complaint of intermittent, mild epigastric pain which always occurred about 3 hours after eating. Three years before his present admission he had been hospitalized in a civilian hospital with a complaint of severe pain in the upper portion of the abdomen. The diagnosis at that time was acute appendicitis. An operation was begun, but shortly after the abdomen was opened his heart stopped momentarily and the operation was terminated. He described the onset and symptoms of that illness as being similar to his present illness, which again was preceded by a period of "fluttering of the heart and epigastric pain." He recovered rather promptly from that illness but had a similar episode 1 year later and was again hospitalized and treated medically. Because he traveled throughout the country he was never hospitalized or treated twice by the same physician for these episodes, and no diagnosis was made known to the patient except that he was told that he was "nervous." He had been separated from the service during World War II for physical disability because of "nervousness." He had never been told of any cardiac abnormality. He denied having had scarlet fever, rheumatic fever, or any prolonged acute or chronic febrile illnesses. He had experienced episodes of frontal headache, insomnia, and tremor of the hands in adult life. There

*Maj. Gen. Leonard D. Heaton, MC, USA, Commanding Officer. From the Laboratory Service. At the time of this conference, Col. Kenneth F. Ernst, MC, USA, was Chief of Laboratory Service.

had been no episodes of cough or hemoptysis and no precordial or chest pain except with these acute episodes.

The family history revealed that his father died at the age of 64 during an "acute heart attack." The mother was living, in her seventies, and had kidney disease. Three siblings were dead: one of tuberculosis, one of "Bright's disease," and one of unknown cause but suspected of having had some form of heart disease. This sibling was also described as being "nervous."

SUMMARY OF FIRST ADMISSION

The patient was in a state of shock on arrival at the emergency room of the hospital. His pulse was 160 to 180 per minute, his blood pressure was at shock level, peripheral cyanosis was present, and his abdomen was markedly tender and rigid. He had had "coffee ground" vomitus and tarry stools for several days. He was taken to a surgical ward with a tentative diagnosis of a perforated peptic ulcer, and a nonsurgical regimen (Seeley treatment) was instituted. He had a markedly enlarged, tender liver and an enlarged heart. A cardiologist was called several hours later because of his precarious condition, manifested by a pronounced tachycardia, rales in his chest, and critical appearance. He was immediately given digitalis with 1.6 mg. of cedilanid (brand of lanatoside C). Oxygen was also given and there was a rather remarkable improvement within the next few hours. His pulse rate slowed, his lungs cleared, the hepatic enlargement receded, and his pain, nausea, and vomiting ceased. He was transferred to the medical service for further study and treatment where he remained for a month before being discharged as improved.

Physical Examination. The following pertinent physical findings were recorded during that admission: There was no thyroid enlargement or unusual adenopathy, and no abdominal masses were palpated after the acute abdominal condition receded except for a residual enlargement of the liver. The kidneys were not palpable. No pedal edema was present, but peripheral veins were distended. The thorax was symmetrically developed, and there was good expansion. The heart remained enlarged (by percussion), and apex beat and left border were at the anterior axillary line. Heart tones were fair, but no murmurs were heard. The second sound at the aortic area equaled the second at the pulmonic area. An occasional premature contraction was present. Peripheral pulses were normal. Blood pressure remained within the low normal range. Neurologic examination revealed nothing abnormal. The fundal arterioles were normal.

Laboratory Studies. An electrocardiogram at the time of initial cardiac examination revealed a nodal tachycardia. Serial electrocardiograms after conversion to sinus rhythm were described

as "presenting marked left axis deviation, prominent P waves, occasional premature contractions, deep S waves over right precordium, and depressed S-T segments suggesting digitalis effect." No serial changes of an acute myocardial injury were seen.

Initial roentgenograms of the abdomen revealed no free gas in the peritoneal cavity. Findings of a gastrointestinal series in the convalescent period were considered normal. A roentgenogram of the chest on the second hospital day showed the bronchovascular markings to be markedly decreased in the right costophrenic angle. Within this area, there were two patches of increased density measuring about 2 cm. in diameter. The right side of the diaphragm was high, and the heart markedly enlarged in both diameters. A roentgenogram 3 days later showed the right costophrenic angle obliterated by fluid extending upward along the lateral chest wall. There was no apparent change in cardiac shadow. Two weeks after admission a roentgenogram showed the lung fields to be clear; the heart remained enlarged in all diameters but showed no enlargement of the pulmonary conus in the posteroanterior view. The esophagus was displaced posteriorly by what appeared to be an enlarged left auricle.

On admission, the white blood cell count was 9,500 per cu. mm. with 91 percent neutrophils and 9 percent lymphocytes; hemoglobin was 13.5 grams per 100 ml. The urinalysis revealed nothing abnormal. Serum amylase was normal on admission.

Course in Hospital. The patient improved with digitalization, rest, and general medical care. A cardiac murmur was first heard one week after admission, when he was described as having a sharply localized apical systolic murmur, and an accentuated P-2. He was discharged to his home 6 weeks after admission but was advised not to work for several months. Seven months later he was readmitted to the Army hospital in a state of acute respiratory distress. Three weeks before this second admission, an attempt to return to work had precipitated pronounced exertional dyspnea, and had increased nocturnal dyspnea to a point where he had several severe episodes a night.

PRESENT ADMISSION

On admission his weight was 137 pounds and he appeared chronically ill. There was a dusky cyanosis of the lips and extremities with a 3-plus pitting edema of the lower extremities. His temperature was normal, and his pulse was 115 with regular sinus rhythm. A harsh grade III systolic murmur was noted which was said to be transmitted to the base. The point of maximum cardiac impulse was felt in the anterior axillary line at the sixth intercostal space. The liver was palpable below the costal margin. The leukocyte count, the hematocrit, and the sedimentation rate were normal. The blood urea nitrogen was normal, and there were

no significant abnormalities in the urine. The roentgenogram of the chest revealed an enlarged cardiac shadow, much the same as before, with increased bronchovascular markings in both lower lung fields. Repeat electrocardiograms at this time revealed the same abnormalities as before, with a sinus tachycardia, occasional premature contraction, abnormal P waves, left axis deviation, and abnormal ST-T segments. No essential change had occurred since the patient's first discharge.

He was placed in an oxygen tent, given quinidine sulfate, and the dose of digitalis was increased. His cardiac rate slowed, the dyspnea lessened, and on the second day he was removed from the oxygen tent. His pulse rate on the morning of the third day was in the 80s, he was much improved and was hungry. On the third day, however, he suddenly developed cyanosis and died.

DISCUSSION

Doctor Mowrey:* Inasmuch as all of you have copies of the protocol and have read it over, we will not go over it in detail but will only briefly outline the salient points in the history and clinical findings, project the chest films (figs. 1 and 2), and ask Doctor Carmichael first to give his interpretation of the ECG given to him this morning (fig. 3).

Doctor Carmichael:** The electrocardiogram shows a sinus tachycardia with a rate slightly in excess of 100. The axis deviation is rather markedly to the left, and of interest is the pattern of the deep S wave in standard leads I, II, and III. There are QS waves in leads II and III. There is a tall R wave in the right arm unipolar extremity lead and a QS complex in the left leg unipolar extremity lead. We were furnished six "V" leads. However, over to lead V_6, the transition zone has not been reached and potentials from the epicardial surface of the right ventricle were still being recorded. In addition, there is notching of the atrial complexes in leads I and II, and the P wave in aVL is diphasic. The P waves of $V_{1,2,3}$ are diphasic, predominantly inverted, and the P waves through the lateral leads are notched.

There are several phases we can be sure of, and several things we can't be sure of. First of all, we can be sure there is a sinus tachycardia. I should quit right there. In addition, there is prolongation of the Q-T interval, and using Bazett's equation I calculated the Q-T interval, with K, or QTc if you prefer the term, equaling 0.45 second. I believe that the notching of the atrial complexes suggests left atrial enlargement and the contour definitely suggests left atrial enlargement. I cannot be definitive about the appearance of the P waves in the precordial leads I, II, and III. I would not be at all surprised if there is concomitant right atrial enlargement. The left axis deviation in

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*Col. Fred H. Mowrey, MC, USA, Medical Consultant to Office of the Surgeon General, Department of the Army, Washington, D. C.

**Lt. David B. Carmichael (MC) USN, U. S. Naval Hospital, Great Lakes, Ill.

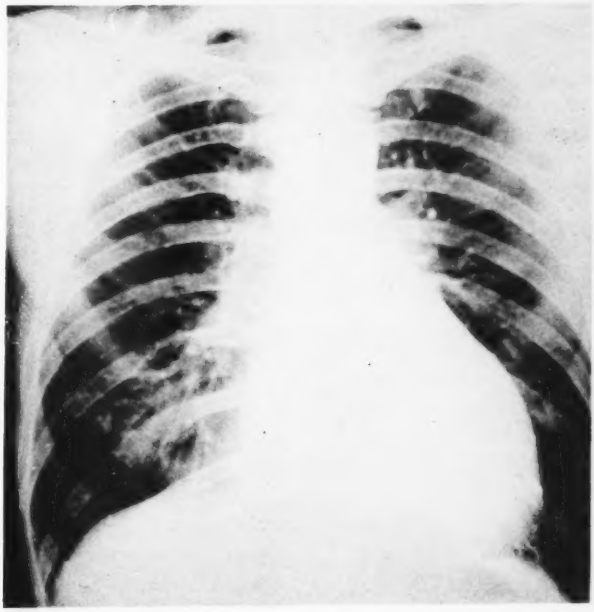

Figure 1. Posteroanterior roentgenogram of chest shortly after first admission.

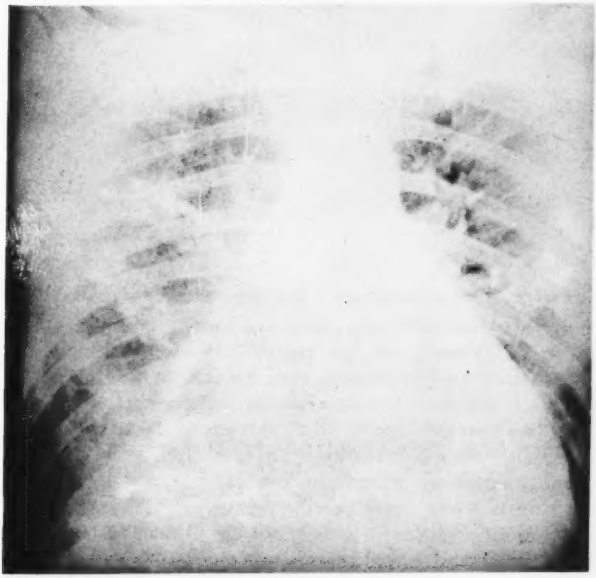

Figure 2. Anteroposterior roentgenogram of chest taken on second admission, shortly before death.

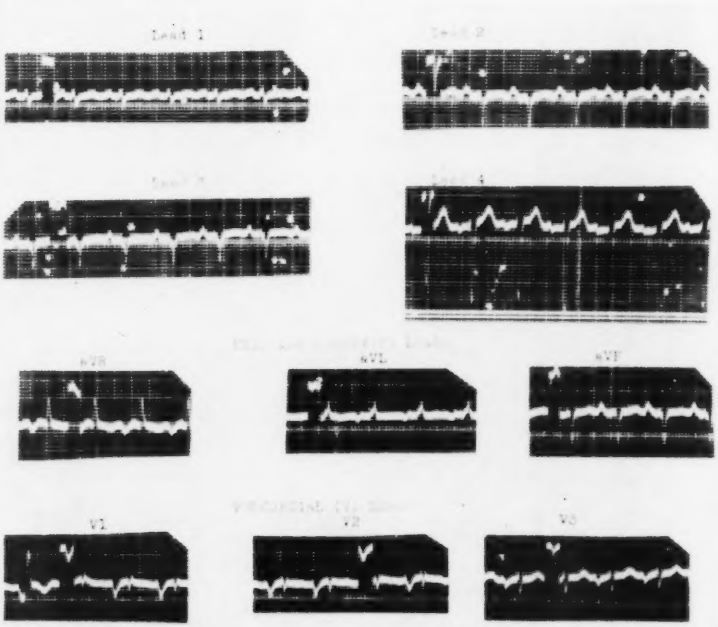

Figure 3. Electrocardiogram taken during second admission.

the vicinity of minus 80° associated with a QS complex in lead II and a QS in III suggests to me the possibility of left ventricular hypertrophy. As I indicated a moment ago, I wish we had precordial leads $V_{7,8,9,10}$ around the back to see what the contour of the left ventricular precordial leads really looks like. However, there is another point, that is, that the transmission zone being shifted very far into the left could mean another situation. In the late 1920's Doctors Sylvester McGinn and Paul White described the so-called $S_{1,2,3}$ pattern of McGinn and White which you see in pulmonary embolism. The transition zone often is markedly shifted to the left in association with this condition. If this were a rapid change over previous tracings—and I am led to

that assumption by a description quite different in the protocol from what we see here—I think we can, in addition to left ventricular enlargement, also assume the possibility of a cor pulmonale. I do not see ST-T wave changes indicative of digitalis effect, and QT prolongation would also mitigate against digitalis effect at the time this electrocardiogram was obtained. My analysis then is sinus tachycardia, left axis deviation, probable left ventricular enlargement, and possible acute cor pulmonale and atrial enlargement.

Doctor Goyette:* I think the first comment to be made about this electrocardiogram is that we are faced with the interpretation of an inadequate electrocardiogram. We should have more leads to the left and also high precordial leads. If aVR is taken correctly, and I must assume that it is, I think that this patient has either right ventricular hypertrophy and/or right ventricular dilatation and atrial enlargement. I agree with Doctor Carmichael that it looks like left, but it may be both.

Doctor Walker:** I agree with Doctor Goyette. I thought it was more like right ventricular hypertrophy and it would be very compatible with acute cor pulmonale. I would like to add one point: The axis deviation is extreme. This is an instance where vector analysis is of great value. The axis is approaching and exceeding the minus 90° and we get to a range where it is difficult to distinguish the left axis and left ventricular hypertrophy from an extreme right axis and right ventricular hypertrophy. I think this a "dead ringer" for severe left ventricular hypertrophy and I think the P waves in V_1 are diagnostic of left atrial enlargement.

Doctor Johnson:*** My interpretation is very much like those already given. We can have all kinds of interpretations here. First of all, I didn't think that the complexes in leads II and III were QS complexes, but that is not of too much importance because the axis is still the same. But I must say I thought more of right ventricular hypertrophy and dilatation. The duration of the QRS is a little prolonged and I think it looks a bit like incomplete right bundle branch block. Otherwise, I agree.

Doctor Pollock:**** I agree with Doctor Johnson. I would add that I don't see a true left ventricular complex anywhere and I would like to see it somewhere before being really sure about it. But I think this is the other type of left ventricular hypertrophy pattern in which the heart has a very bizarre position with left apex posteriorly.

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*Col. Edwin M. Goyette, MC, USA, Chief of Cardiology Service, Fitzsimons Army Hospital, Denver, Colo.

**Lt. Col. Weldon J. Walker, MC, USA, Chief of Cardiology Service, Brooke Army Hospital, Fort Sam Houston, Tex.

***Col. Richard P. Johnson, MC, USA, Chief of Cardiology Service, Valley Forge Army Hospital, Phoenixville, Pa.

****Col. Byron E. Pollock, MC, USA, Chief of Cardiology Service, Letterman Army Hospital, San Francisco, Calif.

Doctor Mowrey: Our time is rapidly passing and you can see there is no unanimity of opinion on the interpretation of the ECG that is available. I might point out this about the ECG you have. No one knows exactly when it was taken, whether it was taken before the patient was first sick, or whether it was taken during his last admission. The previous description given in the protocols referring to this ECG does not agree with what you gentlemen are interpreting in the ECG. Doctor Johnson, what is your diagnosis?

Doctor Johnson: I think this is an unusual case of rheumatic valvular heart disease with very marked aortic valve stenosis and probably mitral stenosis. I base this diagnosis on the fact that a systolic murmur was heard at the apex that could have been transmitted from the base.

Doctor Mowrey: What were these episodes of severe pain that this man had over a period of 6 years?

Doctor Johnson: I think that the mechanism is probably on the basis of acute hepatic distention which resulted from right heart failure associated with left heart failure—the so-called Bernheim's syndrome. There was marked hypertrophy of the left ventricle, which included the septum and encroached upon the volume of the right ventricle, and the inferior vena cava was unable to send its blood into the right side of the heart satisfactorily. This could have caused these episodes of acute hepatic distention. In another respect I would like to mention that a very common syndrome in mitral stenosis are these episodes of pain in the right upper quadrant. They are so characteristic that one might describe them by saying that it is the so-called gallbladder syndrome of mitral stenosis. Because mitral stenosis is more common in women it often mimics the syndrome of gallbladder disease. However, in this patient I think the aortic stenosis was the predominating lesion and that he had a so-called Bernheim's syndrome to explain the acute hepatic distention.

Doctor Goyette: There is one thing this patient had that I am sure about. I am sure he had at least one episode of acute cor pulmonale. I am going to hang my hat on that one thing. I am going to trust my interpretation of the electrocardiogram, and say that I think this patient had chronic cor pulmonale due to repeated episodes of pulmonary embolization. The only other diagnosis I would entertain seriously would be that of endocardial fibroelastosis. However, against that diagnosis, I think the course was rather long. There are usually predominant signs of dyspnea. There are usually systemic emboli. It is true that frequently there are pulmonary emboli too, but I think the systemic usually predominate. The electrocardiogram often shows a bundle branch block. There is frequently a positive family history. I agree with Doctor Johnson that this man had epigastric pain because of acute distention of the liver capsule. I think probably his episode of so-called vomiting of blood and passing of tarry stools was blood which he coughed up, although if you told me that he never coughed blood it wouldn't disturb

me in the least because usually these patients do not have pulmonary infarction; they just have repeated pulmonary embolization. And, if they don't have infarctions they don't cough blood. I will probably sink on this diagnosis, but that is what I am going to sink on.

Doctor Pollock: There is interesting material here to select from, so I am going to take another viewpoint. I think there is good evidence here for a big left ventricle. The apex was found in the sixth intercostal space at the midaxillary line, as I recall, at least the anterior axillary line. This is out pretty far, and from the roentgenogram it should have been there. The left atrium is enlarged. I don't see how we could get that in cor pulmonale. So, on that basis I've got to put a lesion on the left side that will do that, and there wasn't any hypertension. I could get bizarre and call this sarcoidosis, but that is going too far out on a limb so I am going to suggest mitral valve disease with stenosis and some insufficiency producing the murmur at the base. There was congestive heart failure from time to time and probably chronic, recurrent pulmonary embolism, one of which produced the state of shock at the time of the patient's admission to the hospital and perhaps another severe one that caused his death. I agree that stretching of the liver capsule no doubt caused his episodes of pain, and I wonder if arrhythmias may not have accounted for some of the episodes in the past.

Doctor Carmichael: My first choice is endocardial fibroelastosis. I base this on the fact that his condition is associated with (1) chronic congestive cardiac failure, and (2) evidence of both right- and left-sided embolization—that is, embolization of the pulmonary and systemic circulation, and on the course that this man followed. It is true, that the course is a little longer than is usually seen in this rather rare condition. However, there are patients who lived as long as 8 years following the initial onset of embolization. I believe that this man had evidence of both systemic and pulmonary embolization, that he had an enlarged heart with both a left ventricular and left atrial enlargement, as Doctor Pollock indicated, and if I go along with my interpretation of the electrocardiogram, there is evidence of pulmonary embolization and cor pulmonale, and also enlargement of the right side of the heart. I accede to the possibility that these endocardial plaques could have involved the mitral valve and given the evidence of mitral insufficiency that we have, as indicated by the systolic murmur. So, as my first choice, I chose this syndrome which is variously called many things, but in the latest report, by Bland and Castlemen and the group, was called endocardial fibroelastosis.

Doctor Orbison:* So far we have had no agreement, but my first diagnosis was recurrent pulmonary embolization with chronic cor pulmonale therefrom, explaining the recurrent distention of the capsule of the liver. There is one thing that I would like to go a little further with

*Lt. Col. James A. Orbison, MC, USA, Chief of Cardiology Service, Fort Belvoir Army Hospital, Fort Belvoir, Va.

and additionally go far out on the limb. The marked reduction in weight in this patient—from 160 pounds with relatively little evidence of edema, to 130 pounds with considerable evidence of edema—suggests to me a rather profound weight loss, and as we all know, if Doctor Goyette and I are right, this is recurrent embolization. In a younger person we like to look for the source of the emboli and we, of course, are all familiar with the well-known dictum that in a patient with recurrent thrombophlebitis one should always look for carcinoma. So I think that we have to consider the possibility that, if this is recurrent embolization, we should certainly think in terms of a hidden carcinoma, possibly in the abdomen, or possibly in the pancreas. However, we know that it does not have to be there and it could be, for instance, in the prostate or in the testes. Even though this patient could ultimately wind up with Bernheim's syndrome with marked left ventricular hypertrophy, it seems hard for me to believe that a person with a predominantly left-sided lesion could escape having some early manifestation of respiratory difficulty, such as nocturnal or other dyspnea. Except for the acute episodes when he experienced rather agonizing dyspnea, which would certainly go along with the acute cor pulmonale, the signs of ventricular failure predominate in this patient. There are other things which we should clearly consider, for instance, the nervousness and the marked weight loss; one little statement even brought to mind the idea of hyperthyroidism. However, after seeing the electrocardiogram I must say that I was inclined to dismiss that.

Doctor Walker: I would agree with Doctor Carmichael and I do not think he has left me much to say. I think this patient presents obvious pulmonary embolism, yet he has a heart configuration that is not explained entirely on that basis. I think he has diffuse myocardial involvement of both the right and left sides. If I had to tie it all into one diagnosis, I would diagnose it as endocardial fibroelastosis with parietal endocardial thrombosis. I think the cardiac configuration suggests an enlargement of all parts of the heart and possible beginning involvement of the valves. There is no other obvious cause here, and because the program this afternoon was devoted to a discussion of esoteric diseases, I have chosen this diagnosis.

Doctor Mowrey: Doctor Pollock, did you have any thought of superventricular tachycardia possibly being a cause of his epigastric pain?

Doctor Pollock: I do not think so. When he came into the hospital, his pulse was 160 to 180 and we know that paroxysmal auricular tachycardia is at a regular rate that you can almost clock. If you take the pulse every 15 minutes, it should hit the same rate. It was pointed out that he was in shock at that time, but a pulse rate of 160 to 180 is more consistent with what you find in ordinary shock without having to postulate a paroxysmal tachycardia, a varying degree of tachycardia. We do know that at one time he had a nodal rhythm on one electrocardiogram which, unfortunately, we do not have (fig. 4). We do not know how much tachycardia he had at that time. I would not be in a

position to rule out attacks of tachycardia, but I just do not see the evidence for it and, so far as ventricular paroxysmal tachycardia is concerned, that usually would not be consistent with the 8 months that passed without his having to have specific treatment. It usually indicates a rather severe disease and severe difficulty which causes the tachycardia.

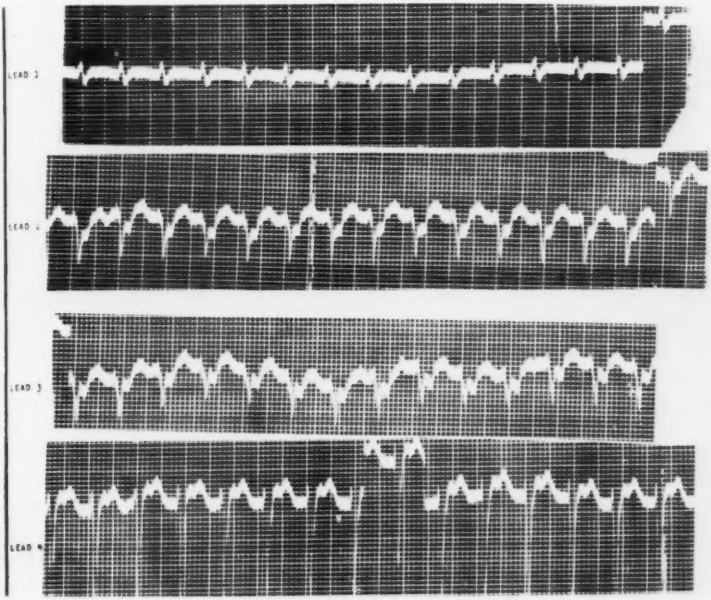

Figure 4. Electrocardiogram, first admission. (This ECG was not available to the Conference.)

Doctor Mowrey: Doctor Walker, will you say a word about this cardiac standstill that occurred when he was operated on for so-called appendicitis about 3 years ago?

Doctor Walker: I think cardiac standstill is not entirely uncommon during operation. The usual factors that are thought to be important are inadequate ventilation, perhaps with accumulation of CO_2; perhaps there are reflex factors that caused it, as indicated by the fact that a common time for it to occur is early during the anesthesia. Anyone with pre-existing myocardial disease would, of course, be more prone to have such cardiac standstill, I believe. It was not stated how rhythm was re-established.

Doctor Mowrey: What disease did you say would be more likely?

Doctor Walker: I just said a pre-existing myocardial disease.

Doctor Mowrey: What kind?

Doctor Walker: I think a patient with any kind of myocardial disease would be more prone to develop ventricular standstill or fibrillation. I had not thought of any particular, specific disease being associated with cardiac standstill.

Doctor Mowrey: Isn't there one disease that had been postulated as one of the diseases here—namely, aortic stenosis—very commonly a cause of cardiac standstill and sudden death, or rather that cardiac standstill during operation is more common probably in patients with aortic stenosis than in any other type?

Doctor Walker: Syncope is common. But that was not my diagnosis.

Doctor Goyette: As a matter of fact, fibroelastosis, which was my number two diagnosis, is a very common cause of cardiac standstill. That is why I thought of it. Persons with other conditions mentioned, particularly rheumatic heart disease, do not tolerate operation too badly unless extremely decompensated. Here the abdomen had just been opened and the heart stopped, and I think from what little reading I have done on it, it is not at all an uncommon characteristic of fibroelastosis.

Doctor Mowrey: While you are still talking, Doctor Goyette, what are the causes of sudden death such as this patient had?

Doctor Goyette: I think in this particular case that the two most likely possibilities are (1) a massive pulmonary embolus which caused his death, or (2) quite likely an arrhythmia which passed rapidly into ventricular fibrillation, or began as ventricular fibrillation due to the severe anoxia associated with either the pulmonary embolism or fibroelastosis.

Doctor Mowrey: Do you think cyanosis is of any particular significance in this case, and do you think there may be some type of congenital heart lesion here?

Doctor Goyette: I am paying a great deal of attention to the cyanosis in this case. When we see cyanosis we think of one of three conditions: (1) A right-to-left shunt, which usually produces persistent cyanosis (it was not persistent in this patient so I do not think that it was the cause of his cyanosis); (2) stasis, which produces peripheral cyanosis; and (3) some sudden interference with aeration such as occurs in pulmonary embolism or infarction. I think that, because this man was always cyanotic with these episodes and because he died suddenly, his death must be placed on the latter basis, and this is one of the things to which I have attached a great deal of weight.

Doctor Mowrey: Doctor Johnson, will you talk a little bit more about this systolic murmur? How does it fit in with the diagnosis of mitral stenosis or aortic stenosis?

Doctor Johnson: Probably the most common valvular lesion to be overlooked clinically is aortic stenosis. Usually the reason for this is that physicians do not listen to the base of the heart; they only listen to the apex. But that is not a true explanation. I think that, with patients who are sick and who have tachycardia, it is very easy to overlook significant murmurs. In the diagnosis of aortic stenosis—even though occasionally it happens that the murmur is loudest at the apex as compared to the base—if one listens very carefully in the right space one hears a very classic diagnostic pathologic murmur—the rough, rasping, harsh murmur of the stenosis. It is much more common to overlook this lesion in patients who are in their 50's, 60's, and 70's than in a man of this age.

Doctor Mowrey: I could go on with this discussion for some time but I understand that there is a guest speaker to discuss this case. It has been suggested that the diagnosis is (1) heart disease, perhaps mitral stenosis, perhaps aortic stenosis, or a combination of both; (2) myocardial fibroelastosis; or (3) acute and chronic cor pulmonale. These are the three main diagnoses which have been made.

Dr. Johnson's diagnoses:

1. Rheumatic valvular heart disease with aortic stenosis
2. Bernheim's syndrome

Dr. Goyette's diagnoses:

1. Cor pulmonale
2. Chronic pulmonary embolization

Dr. Pollock's diagnoses:

1. Mitral stenosis
2. Congestive heart failure
3. Chronic pulmonary embolization

Dr. Carmichael's diagnoses:

1. Endocardial fibroelastosis
2. Chronic systemic and pulmonary embolization

Dr. Orbison's diagnoses:

1. Recurrent pulmonary embolization
2. Chronic cor pulmonale

Dr. Walker's diagnosis:

Endocardial fibroelastosis with parietal endocardial thrombosis

PATHOLOGIC FINDINGS

Doctor Ernst: Doctor William Howell,[1] who reported this case in the *Texas State Journal of Medicine,* is here today and I hope he will comment later. Doctor J. N. P. Davies, Professor of Pathology at

the University of Uganda, East Africa, is also in the audience today and has consented to describe his findings in East African natives who have this disease. With these interesting things in the offing, I will give the findings in this particular case, and make only brief reference to the literature.

There was an infarct in the spleen, chronic passive congestion of the liver, and nothing of significance in the kidneys. The heart was enlarged, weighing 675 grams. There was no cor pulmonale. There was slight to moderate atherosclerosis of major vessels, including the coronaries.

On opening the heart, the valve cusps and leaflets were not significantly altered, but a greatly thickened endocardium was seen over a substantial portion of the left ventricle, and there was mural thrombosis at the apex (fig. 5).

Figure 5. Gross specimen of opened heart.

There were no detectable areas of myocardial infarction nor of myocardial fibrosis except for a minimal degree along vascular septa, usually in close proximity to the endocardial surface. There was no thrombosis of luminal or thebesian vessels. The varying degrees of the thickening of the endocardium are shown in figures 6 and 7, and, for comparison, figure 8 illustrates the endocardium of the atrium.

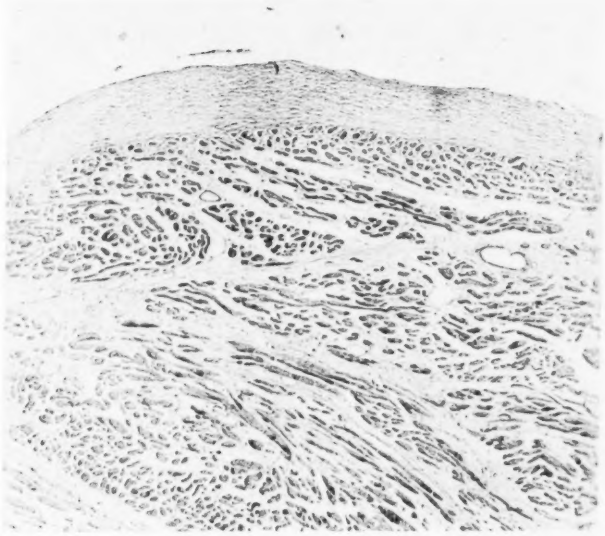

Figure 6. Photomicrograph showing thickened endocardium of the left ventricle. (× 50)

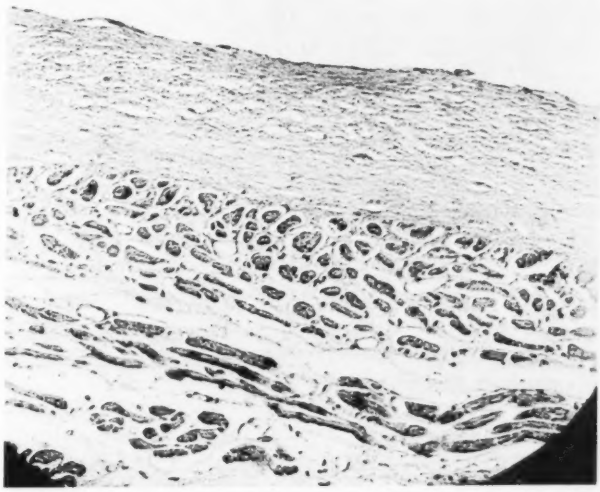

Figure 7. Photomicrograph showing thickened endocardium of the left ventricle. (× 110)

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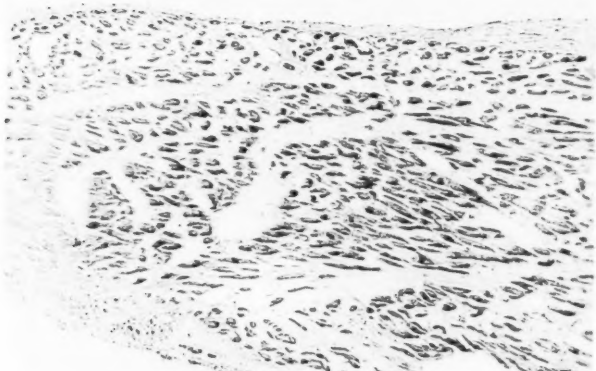

Figure 8. Photomicrograph showing endocardium of right atrium. (× 50)

The entity under consideration today has been variously described in the literature as endomyocardial fibrosis or fibroelastosis, cardiovascular collagenosis, endocardial fibrosis, or fibrosis with mural thrombosis and endomyocardial necrosis.

The earliest accounts of this disease dealt mainly with children, but more and more reports on similar cases in adults are appearing in the literature. Clinically, there is cardiac hypertrophy, sometimes alterations in conduction time with sudden death, or death in congestive failure—all without clinical or autopsy evidence of coronary or valvular disease.

Anatomically, there may be patchy or diffuse thickening and opacity of the endocardium consisting either of collagenous tissue alone, or collagenous and elastic tissue together, which may extend in among the muscle fibers along the vascular septa. Added to this, there is frequently a mural thrombus overlying the thickened endocardium within the chamber involved, and embolization.

In general, the anatomic findings in both the child and the adult bear some resemblance to each other, but there are points of difference. Mural thrombosis is more frequent in adults, although it has been noted in children. Congenital defects are frequently encountered in children.

Although the elastic tissue element has been stressed in many case reports, there were several rather large series of adult cases reported during the past 2 years in which elastic tissue was not demonstrated.

There are numerous other pathologic entities which may cause either focal or diffuse endocardial thickening, and these should be ruled out before a diagnosis of endocardial sclerosis is tenable. Included in this category are coronary disease with infarcts, endocardial pockets appearing beneath incompetent valves, a spread of fibrosis from the valves to the endocardium in subacute bacterial endocarditis, some cases of rheumatic and diphtheritic myocarditis, and disseminated lupus erythematosus. It is not present in congestive failure unless complicated by anoxia due to vascular sclerosis and possible infarction.

Many theories as to its causes have been advanced, and one of the most popular when the disease is found in children is that it is a congenital defect, because it is frequently noted in patients with other defects. It has been observed in siblings. In some patients, particularly adults, there is usually a family history of obscure heart disease, as in our patient, and a congenital cause in these adult cases is suspected on the basis of a smaller degree of involvement at the time of birth. Infectious disease in the mother during pregnancy has been found in a significant number of cases. An inflammatory cause has been suggested, but bacteria have not been found and the patients are usually afebrile.

It has also been suggested that at least some of these cases may be caused by a dietary deficiency disease such as beriberi, but the findings at autopsy, the history of dietary inadequacies, or the response to therapy should assist in ruling this entity in or out. Myocarditis has been considered, but usually no such history is obtainable. Some of the findings in these patients include fibrinous changes with staining characteristics found in other collagen diseases, and therefore this entity is believed possibly related to that group.

Another theory places the disease on a mechanical basis due to stretching of the endocardium and the dilated heart, but a satisfactory explanation for dilatation is frequently not forthcoming.

There is one attractive theory, particularly applicable to children, which places the blame on a situation of anoxia. There have been carefully documented cases where anomalies that could conceivably result in anoxemia of the affected chamber were present. These included the situation where the left coronary arose from the pulmonary artery, and in pulmonary atresia where hypertrophy of the right ventricle and fibroelastosis of this chamber were found. It was found in the left ventricle in aortic atresia, both with and without interventricular septal defects, and in the left atrium and ventricle in premature closure of the foramen ovale without defect. In premature closure with a septal defect and atresia of the mitral valve, the fibroelastosis was present

in the left atrium but not in the left ventricle. Cases of premature closure with a septal defect fail to show the condition.

Pathologic diagnoses:

1. Endocardial fibroelastosis with mural thrombosis at apex of left ventricle
2. Infarct of spleen
3. Chronic passive congestion of liver

(Doctor Howell related the findings in another similar case.)

Doctor Ernst: Are there any comments from the floor? Or from the panel?

Doctor Davies, we should be very happy to see your material now and to hear your thoughts on this entity.

Doctor Davies: It is a very great pleasure to be here in this very famous hospital and meet you gentlemen of the United States Army. In our part of the world we never seem to see the senior service, and although we are a thousand miles from the ocean we frequently see your colleagues from the Navy, which always seems a bit odd to us.

I would like to draw your attention to this entity. It is important to us in Africa, because it forms about one in five of all our patients with congestive cardiac failure. It is therefore our most common and important form of heart disease, clinically and, to a great extent, pathologically. We have that confirmed because it first came up as a military problem, being recognized in African troops in Cairo in the middle 1940's by Bedford and Constance of the British Army. About the same time in Africa I independently became aware of the entity and I have seen about 106 cases since 1946. In some patients these changes are minimal and confined to the apex, but, characteristically, this condition presents a mass of fibrous tissue at the apex, often with a rolled, rather sharply defined surface. The process may extend upward to involve the mitral valve, and the mitral valve may fuse with the ventricular endocardium. It may also go down into the myocardium, and that is why we call it endomyocardial fibrosis. A great mass of clot may partially fill the ventricle, and underneath the clot the fibrosis is found.

The wall of the septum is almost invariably spared. Sometimes you see a condition in which the whole of the inside of the ventricle is just a mass of white fibrous tissue looking as if it had been laid on with a paint brush. You may find a tremendous amount of calcification in the endocardial mass. You also get, and not infrequently, considerable calcification of the mitral valve. It occurs on both sides of the heart, but there is one difference between the lesions in the right ventricle and those in the left ventricle and that is, that though basically similar, if the lesion in the right ventricle grows over a certain

size, it leads to obliteration, as we call it, of the right ventricle. We recognize this from the outside by a highly characteristic depression of the apex of the right ventricle, which is a puckered, indrawn scar, and we know that when we look inside we are going to see a considerable degree of fibrosis of the right ventricle. You may see a layering of the fibrous tissue which has, as it were, sealed off the triangular apical area and has reduced the cavity of the ventricle to a saucer. The blood comes in, swirls in the saucer, and goes out through the infundibulum and not down to the apex at all. The tricuspid valve may also be involved in the process.

We have never seen any valvular lesions in the absence of an apical or other lesion of the myoendocardium. The involvement of the different regions of the heart is about equal between the two ventricles, but much more severe lesions are present in the left ventricle. In my experience 12 of them were very severe as opposed to only 9 in the right ventricle. The mitral valve is involved in 75 percent of cases, and if you are equating competence with adhesions of the posterior cusp, then 18 of those cases were in mitral incompetence and 2 of them seemed to be stenotic. The tricuspids were involved in 72 percent; the aortic and pulmonary valves are never involved.

The weight of the heart in these African patients tends to be rather low. It ranges from about 130 grams to about 680 grams; usually it falls below 500, the weights of most actually ranging from 200 to 400 grams. So, broadly speaking, these hearts are not hypertrophied.

The incidence of mural thromboses in 32 hearts was as follows: 41 percent of the hearts showed mural thromboses in the left ventricle, and 16 percent in the right; 6 percent showed it in the left auricle, and 34 percent in the right. Despite this, embolic phenomena in Africans are virtually unknown. In something over 100 cases, I have seen about three or four of emboli only.

The autopsy diagnoses of 231 recent cases of heart failure showed that this disease was responsible for 14.3 percent, being exceeded only by 14.7 percent with syphilitic aortitis and 16 percent with renal hypertension. The cause was not determined in 14.7 percent. Essential hypertension is virtually not seen and we did not have a single case of coronary thrombosis. In fact, I have not seen a case since I left this country in 1950.

The preceding figures possibly even underestimate the incidence of this condition. In 167 cases very carefully studied by my cardiologic colleagues at the postgraduate school of London, it was reckoned that endomyocardial fibrosis was responsible for 21 percent of the deaths from heart failure in the series. Syphilitic aortitis and renal hypertension were again frequent, coronary thrombosis was absent, and there was only one case of thyrotoxic heart failure.

Histologically, a layer of superficial thrombosis is often present. Then there is a layer of hyalin acellular fibrous tissue, and beneath that there is always a layer of dilated blood vessels which we call the granulation tissue or vascular layer, and if there is any infiltration of cells to any extent it is usually very minimal in this region. Going down into the myocardium are streaks of fibrous tissue around thebesian veins, but other histologic changes are rather indefinite. One might see what is called moth-eaten fibers and interfibrillary edema. No excessive glycogen is present; the interfibrillary edema may become very extreme, and the myocardial fibers may actually break down. There is no evidence of any elastosis. It also differs from it in that it seems to be more a destructive, rather than a proliferative, lesion.

Frankly, we just do not know what the cause of this condition is. We do know quite definitely what it is not. It might be a virus condition, and if we could establish more of the geographic distribution we might get a little nearer it. I thought it might be related at least to Loeffler's disease but Professor Uringer, whom I met in the city last week, denies it hotly, and as he did the pathology of Loeffler's disease he ought to know what it is. It is certainly not due to any known cause of heart disease. There is no coronary disease; as far as one can tell, there is no association with anemia. I have a strong suspicion that this is malnutrition, but I frankly admit that I do not have a ghost of an idea what form of malnutrition it might be. I would say that I think this is common over most of the tropical world. We now know that it occurs not only in Uganda, but in the Sudan, in West Africa, on the Gold Coast, in Liberia, and all over east Africa. I have heard of cases occurring in Oceania, which is a part of the world that you are particularly concerned with. I have heard rumors that it occurs in the Philippines, and there is a recent suggestion that it is one of the commonest diseases of the hill country in India. At any rate, I think that when we all put our information together in the future we might find that this is by no means as uncommon as we suspect. I would point out how difficult it is to teach medicine in a part of the world where a heart disease that causes one in five deaths is a type of disease not mentioned in textbooks.

Doctor Ernst: Doctor Mattingly, will you close the meeting?

Doctor Mattingly:* I had this patient when I was at Brooke Army Hospital in 1948-1949 and our final clinical diagnosis was idiopathic hypertrophy and failure. We considered many of the diagnoses discussed by the panel, including fibroelastosis. The pathologic material has been reviewed by many pathologists, including Doctor Castleman's group at Massachusetts General Hospital, and the present diagnosis was concurred in.

*Col. Thomas W. Mattingly, MC, USA, Chief of Cardiovascular Service, Walter Reed Army Hospital, Washington, D. C.

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Vivax Malaria in a Returned Korean Veteran

FRED B. ROGERS, *Lieutenant (MC) USNR*

VIVAX malaria has been observed for the first time in many Korean veterans after their return to the United States. Sporadic cases of tertian malaria among returned veterans of Korean service have been reported from various parts of this country. Such delayed appearance of clinical malaria has usually occurred many months after the cessation of antimalarial suppressive therapy. Problems in diagnosis may result from not considering this possibility in those returning from areas where exposure to endemic malaria is known. In the present case, the interval between probable exposure and development of symptoms was over 15 months—about 8 months of chloroquine phosphate suppressive therapy plus 7 months after the cessation of therapy. The following case is reported to stress the fact that delay in administering adequate therapy in vivax malaria may convert a rather trivial ailment into a major illness. Also, this case emphasizes that when a febrile illness appears in a Korean veteran, the possibility of malaria should be considered in the differential diagnosis. The increasing incidence of Korean vivax malaria recently reported in the United States has been proportional to an augmented interest in its detection.

CASE REPORT

A 24-year-old man was in good health until 4 days before admission to this hospital on 30 June 1953, at which time he suddenly developed fever, chills, frontal headache, generalized weakness, and body aching. These complaints lasted for 1 day and subsided after resting overnight. Similar symptoms recurred 2 days prior to hospitalization; the second episode lasted about 8 hours. No dark-colored urine or any reduction in the volume of urine was reported during this period. On entering the hospital, he complained of high fever, severe chills, frontal headache and photophobia, prostration, and aching in the low back and extremities.

Past history disclosed Army service in Korea from 13 November 1951 to 28 October 1952. He had served for 8 months as a combat rifleman and later was stationed at Regimental Infantry Headquarters. His duty station had been near Chorwon, Hurchon, and along the northeastern Korean coast, at and above the thirty-eighth parallel. He had taken

From Temple University Hospital. Lt. Rogers is now assigned to U. S. Naval Reserve Surface Division 4-25 (Hospital), Philadelphia, Pa.

antimalarial suppressive therapy (one tablet of chloroquine phosphate weekly) in Korea from April 1952 until after boarding ship for return to the United States the following November. He was discharged from the Army in January 1953 in good physical condition. His health had remained satisfactory until the present illness. No known contact with, or symptoms of, clinical malaria were reported prior to this hospitalization. Past diseases had included uncomplicated measles and chickenpox in childhood; he had also had an appendectomy and a tonsillectomy.

Physical examination on admission showed an acutely ill, robust white man. Oral temperature was 104.4° F. General prostration was evident. The skin was hot and moist. The conjunctivae were moderately congested, but the sclerae were clear. The tonsils were absent; the pharynx was otherwise regular. Moderate-sized, discrete, nontender lymph node enlargement was palpated in the neck, and axillary and inguinal regions. Febrile tachycardia, rate 132 per minute, was present with a cardiac apical gallop and faint systolic murmur, initially suggesting the possibility of a bacterial endocarditis. The heart was not enlarged. Blood pressure was 100/70 mm. Hg. The lungs were normal. The spleen was slightly enlarged to palpation and percussion. No flank or costovertebral angle tenderness was elicited. Rectal examination was negative. All extremities were normal.

Laboratory studies on admission revealed a normal hemoglobin (13.5 grams), leukocyte count (5,000 per cu. mm. with a nonspecific differential count), and hematocrit (40 percent). The sedimentation rate was elevated (corrected Wintrobe, 26 mm. per hour). Thin and thick smears of the peripheral blood, taken at the time of rising fever and stained by Giemsa's method, were positive for *Plasmodium vivax*. The blood smears showed trophozoites and schizonts in various stages of development. An occasional gametocyte was also present. Recently liberated merozoites were also seen in small numbers. Examination of the blood confirmed the diagnosis of vivax malaria suggested by the clinical findings. Liver function studies (serum bilirubin, cephalin-cholesterol flocculation, and alkaline phosphatase) were normal. Blood cultures were sterile. Kolmer complement fixation reaction was very strongly positive (4444) (or 32 Kolmer units) but the Kahn and Venereal Disease Research Laboratories (VDRL) reactions were negative. (The positive Kolmer reaction was interpreted as a biologically false positive test attributable to malaria.) The heterophile antibody titer test was negative. A urinalysis showed normal findings, and a roentgenogram of the chest was negative.

During the first few days in the hospital, several typical paroxysms of tertian malaria occurred. A sharp rise of temperature was recorded, reaching over 104° F. within a period of 4 hours, then subsiding to a normal level during the subsequent 4 hours. Because the patient's illness was service-connected he was transferred to the Veterans Administration hospital in Philadelphia on 3 July 1953. The diagnosis of

vivax malaria, once established, was reported to the City Department of Health by telephone and post, as required.

The therapeutic regimen employed in this case was 1.0 gram of chloroquine phosphate initially, followed by 0.5 gram 6 hours later, then 0.5 gram daily for 2 days. The chloroquine was given in conjunction with primaquine phosphate (brand of 8-(4-amino-1-methylbutylamino)-6-methoxy-quinoline diphosphate), 15 mg. initially, then daily for 14 days. The patient recovered clinically on the above therapeutic program. No malarial parasites were demonstrated in the peripheral blood and the Kolmer reaction was negative before he left the hospital on 13 July 1953. Repeat hemoglobin, leukocyte count, and thick blood smear were normal following therapy and on subsequent recheck 1 month after the patient returned home.

DISCUSSION

Spurred by global war and the resulting widespread distribution of military personnel, an immense volume of research on malaria has been carried out in recent years. This research has covered a wide field, including studies of the parasitology, and of mosquito bionomics and control measures, and the development of antimalarial drugs, insecticides, and repellants.[1] Prior to the outbreak of hostilities in Korea in 1950, malaria in that country had attracted relatively little attention. One of the most important medical problems encountered during military activities on the Korean peninsula, however, was the high incidence of vivax malaria. Since 1950 much information has been obtained concerning the natural history of this disease in man and its response to antimalarial drugs. Hankey and associates[2] in 1953 reported the relapse pattern in naturally acquired Korean malaria as it appeared in over 1,500 returning American military personnel. Many parts of the United States are known to have suitable mosquito vectors for the transmission of malaria, should the carrier state in infected persons allow transmission. Last year, Burnetti[3] reported an outbreak of Korean malaria in California involving 34 Camp Fire Girls who were infected by a carrier who had returned from Korea. To determine the nature of this disease more accurately, Arnold and associates[4] at the Army Malaria Research Unit at the University of Chicago recently studied six human volunteers who were mosquito-inoculated with the St. Elizabeth strain of Korean vivax malaria. Four of these heavily-infected subjects, in whom the exact date of infection was known, were followed beyond the apparent spontaneous termination of the disease. Observation of these patients confirmed the impression gathered from studies in the field that Korean malaria is similar in its natural history to other temperate zone malarias and terminates spontaneously before 18 months' time. In the four patients followed up to 18 months beyond this terminal period, no evidence of continuing activity was found. About 3 years after initial in-

fection, moreover, transmission of the disease was not accomplished by direct blood transfusion into nonimmune volunteers.

Chloroquine phosphate and related drugs, effective against the erythrocytic phase of the disease, do not affect the tissue phases of vivax malaria. Chloroquine, by virtue of its relatively long persistence in the body, will abort one or two attacks following the initial paroxysm; after this interval the previous periodicity reappears. By contrast, primaquine is effective solely against the tissue phase of the plasmodia. Chloroquine used in combination with primaquine in adequate dosage, therefore, can now prevent relapses in practically all cases.[5] Because of its relatively low virulence, the St. Elizabeth strain of *P. vivax* (causing Korean malaria) is readily controlled by antimalarial drugs. Clinical symptoms are easily masked, however, by the usual suppressive therapy. In addition, the relatively benign character of this disease tends to promote its chronicity. This also accounts for the clinical attacks which may occur after a prolonged quiescent interval following the cessation of suppressive therapy. A recent detailed study by Hall[6] reports a statistical analysis of 95 patients having Korean vivax malaria and reviews problems met in the diagnosis and treatment of this disease.

SUMMARY

A case of vivax malaria is reported in a returned Korean veteran. This patient first showed clinical symptoms over 15 months following probable exposure and 7 months after cessation of chloroquine suppressive therapy. In this respect he was similar to other cases of so-called "benign" tertian malaria seen sporadically in those returning from military service in Korea. That such cases are infrequently met in the general population is attested by the fact that this was the only case of Korean malaria admitted to this large general hospital during the past 5 years. A high index of suspicion for malaria is warranted in returned veterans with febrile illness in order to establish correct diagnoses.

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Foreign Body in the Urinary Tract

EARL C. LOWRY, *Colonel, MC, USA*
JOSEPH N. LIONTI, *Major, MC, USA*

FOREIGN bodies get into the urinary tract by one of three methods: (1) Through the urethra to the bladder and thence to the ureter and kidney; (2) by way of the gastrointestinal tract with erosion through the intestinal wall; and (3) by external violence.

Those foreign bodies entering through the urethra are numerous and the great majority of cases are not reported. They may occur in children, in mental patients, during erotogenic acts, and possibly secondary to instrumentation or an operative procedure. Insertion of a foreign body into the urethra or bladder is commonplace; however, for the patient to pass it into the ureter is unusual. We are therefore reporting a case in which the patient passed a thermometer into the left ureter. There are reports of a cat hair[1] and seed-bearing straw ascending the ureter, the latter as far as the renal pelvis. Common objects removed from the bladder and/or urethra are nails, rods, bobby pins, hairpins, safety pins, straw, toothpick, pencil, toothbrush handle, candle, rubber or leather tubing, and thermometers. Less commonly one may see needles, nail files, glass or plastic vials, and seeds. Even snakes, earthworms, and a watch chain have been reported.[1]

Foreign bodies entering through the gastrointestinal tract arrive in the genitourinary tract in one of three ways.[2] Stiff or sharp objects will not pass easily through the curvatures of the second portion of the duodenum; hence, they perforate and may enter the right kidney. One of us (ECL) has seen a bobby pin do this and, in another patient, a toothpick perforate at that point and form an intraperitoneal abscess without entering the kidney. A second group of objects penetrates the gut in the region of the right colon near the hepatic flexure and from there may easily reach the kidney. Gondos[3] mentioned two such cases. The third group of foreign bodies penetrates the left colon and reaches the kidney or ureter on that side. Fish bones seem to penetrate more often in this manner.

Foreign bodies resulting from external violence are seen most commonly in war casualties. Cases reported consist of bullets and mine or shell fragments. We have seen fragments of clothing,

From Letterman Army Hospital, San Francisco, Calif.

debris, and in one instance a button enter the renal pelvis in a war wound; in several instances, bone fragments from extensive wounds have been found in the bladder.

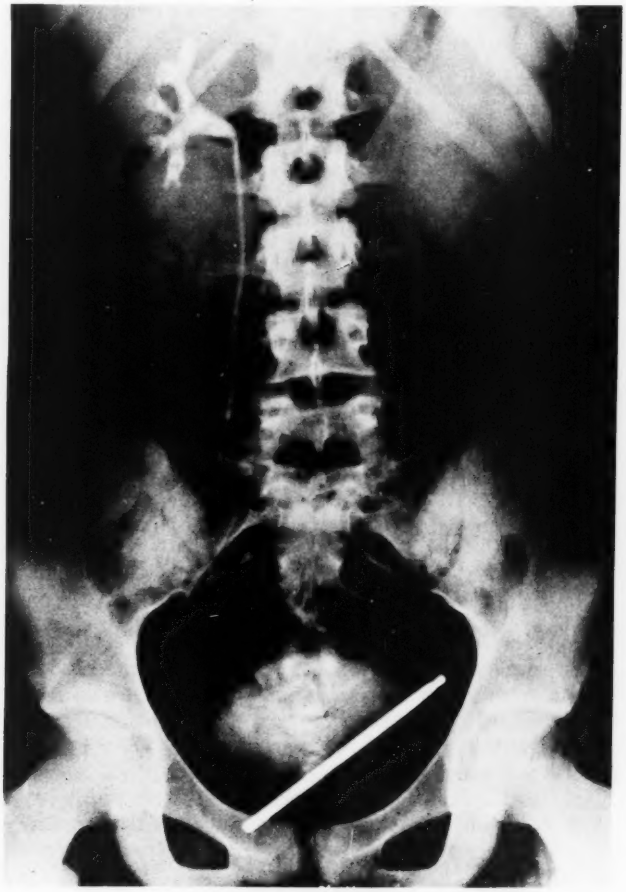

Figure 1. Intravenous pyelogram, 30 minutes, showing good function in the right kidney, no function in the left kidney, and thermometer in the bladder. Note tip of thermometer extends beyond the bladder wall.

CASE REPORT

A 14-year-old girl with the mental age of about 8 years was examined at this hospital on 26 January 1955. She gave a history of three episodes of severe urinary tract infection during the past year, associated with pyuria, fever, and left abdominal pain. In spite of continued therapy the pyuria persisted.

Physical examination was essentially normal. Urinalysis revealed large numbers of white blood cells and some red blood cells. Intravenous pyelography revealed a rectal thermometer in the bladder, extending into the region of the lower left ureter. The right kidney and ureter were of normal function and architecture. There was no evidence of left renal function in 30 minutes as manifested by intravenous pyelography (fig. 1). On vaginal examination the tip of the thermometer could be easily felt in the left vaginal vault.

Figure 2. Intravenous pyelogram, 15 minutes, taken 10 days after removal of thermometer, showing return of function of left kidney.

On the following day, under general anesthesia, cystoscopic examination revealed the thermometer lying obliquely in the bladder with one end entering the left ureteral orifice and the other end pressed tightly against the right lateral bladder wall. At least one half of the thermometer extended into the ureter. The thermometer was removed by pulling the distal end into the urethra, and the pressure exerted

from above pushed it out of the urethra so that it could be extracted. A retrograde pyelogram was made immediately of the left kidney and ureter and they appeared to be normal.

The patient was discharged on the following day, and 10 days later intravenous pyelograms revealed normal function and structure of both kidneys and ureters (fig. 2). The parents stated that the thermometer in question had been missing for about 1 year, and the patient then admitted that she knew it was in the bladder.

SUMMARY

Foreign bodies are always to be considered in cases of urinary tract infection that fail to respond to treatment or that recur repeatedly without explanation. This is particularly true in children and more especially true in mentally deficient children. Roentgen examination is of great importance in searching for foreign bodies. Cystoscopy and retrograde pyelography are the best methods of examining the lower tract, because a nonopaque object in the bladder may thus be visualized. A case is presented which illustrates the importance of urinary tract evaluation in such cases.

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THE NEUROGENIC BLADDER

One with a neurogenic bladder must be considered a lifelong patient and never be discharged from observation. Experience has shown that this condition has a poor prognosis as far as late complications and longevity are concerned. The outstanding complication is infection of the bladder with subsequent pyelonephritis and renal damage. Other complications are urinary tract calculi, ureterovesical reflex (most common with autonomic bladders), periurethral diverticula and fistulas, as well as decubitus ulcers.

—GREGORY S. SLATER, M. D.
in *Postgraduate Medicine*
p. 23, Jan. 1954

Heredofamilial Polyposis of the Large Intestine

Report of Two Cases With Positive Family History

LAWRENCE L. BEAN, *Captain (MC) USN*
NICHOLAS P. KITRINOS, *Lieutenant (MC) USN*

HEREDOFAMILIAL polyposis of the large intestine is defined as a true polyposis, in contrast to the pseudopolyposis secondary to acute or inflammatory disease of the colon as in ulcerative colitis, et cetera. An excellent classification of polyposis of the colon was first proposed by Erdmann and Morris[1] in 1925 and is the one most commonly accepted to date. They divide polyposis into two major types:

1. Adult (acquired) type—as seen in adult life and where examination reveals evidence of inflammation and scattered polyps.

2. Adolescent (congenital, disseminated) type—as seen in adolescence and where a family history can be elicited.

This presentation deals with the latter entity.

HISTORY

Dukes[2] first called attention to the disease entity in 1930 when he collected scattered reports; one, published as early as 1721, is by Menzel,[3] who is credited with first describing a case of diffuse polyposis of the colon. Luschka[4] in 1871 reported a case of multiple polyposis in the colon of a woman 30 years of age. Virchow[5] in 1863 is credited with the first complete description of the disease in a 15-year-old boy; but to Cripps[6] in 1882 goes the credit for recognizing and describing a true familial multiple polyposis occurring in a brother age 19, and a sister age 17. In 1901, Boas[7] further described the disease and noted an apparent hereditary factor; in the 1930 paper of Dukes it was shown that the disease was a definite mendelian entity.

The excellent work by McCarty[8] in 1953 summarized these facts and added that to Lockhart-Mummery[9] in 1934 goes the credit for showing that the disease is an example of gene mutation. This opinion was also expressed by Hoxworth and Slaughter[10] in 1948.

From U. S. Naval Hospital, Great Lakes, Ill.

CASE REPORTS

Case 1. A 33-year-old white man was admitted to this hospital on 10 September 1954 with a diagnosis of polyposis, intestinal, adenomatous. The history dated back to 1948 when he began passing blood per rectum in small quantities. On 23 August, however, he suddenly passed a large amount of bright red blood per rectum and went into peripheral vascular collapse. He was immediately taken to a hospital near his home and was treated by transfusions. Sigmoidoscopic examination at that time revealed three large polyps.

The past history and social history were not significant. The family history revealed that his maternal grandmother died of carcinoma of the bowel; his mother died of carcinoma of the bowel at the age of 29, an aunt died at 47 of the same, and two of the latter's children, cousins of the patient, had polyposis. One died of carcinoma of the bowel at 36 and the other has a permanent ileostomy. A second aunt was unaffected, as have been all of her children. A 38-year-old sibling of the patient was found to be normal on examination.

Findings of a physical examination were entirely negative. Complete blood count, urinalysis, and serologic tests were normal except for mild anemia. The roentgenogram of the chest was negative. A barium enema revealed multiple rounded radiolucent defects in the large bowel which were interpreted as multiple polyps (fig. 1). On 13 September a sigmoidoscope was passed to the 25-cm. level and multiple polyps were found, beginning at 7 cm. and extending the full depth of the sigmoidoscope. Examination of a biopsy specimen of several of the polyps revealed benign adenomata. He was treated with whole blood transfusions and on 25 September, under general anesthesia, a total colectomy was done, including a small portion of the ileum and preserving about 7 cm. of rectum. Following this an ileoproctostomy was done. The pathologic report was multiple polyposis with no evidence of malignancy. Figure 2 shows a portion of the operative specimen. The patient had an uncomplicated postoperative course until 18 November when he developed a small rectal fistula. On 19 November, under general anesthesia, a fistula in ano was incised. Following this procedure he became asymptomatic and all wounds healed. By the middle of November, the patient was having three to six semiformed stools a day with excellent control.

On 8 December proctoscopic examination revealed that the anastomosis was in excellent condition. One polyp was fulgurated and no others were found. By 6 January 1955, the date of discharge, he was having three semiformed stools a day.

He returned to the hospital on 29 March for a follow-up examination and sigmoidoscopic examination revealed that the anastomosis was still visible; about eight polyps were fulgurated. He was now having three formed stools a day and his weight had returned to what it was prior to the onset of his symptoms. He has been instructed to return

to this hospital in about 4 months and periodically thereafter for further evaluation and treatment if indicated.

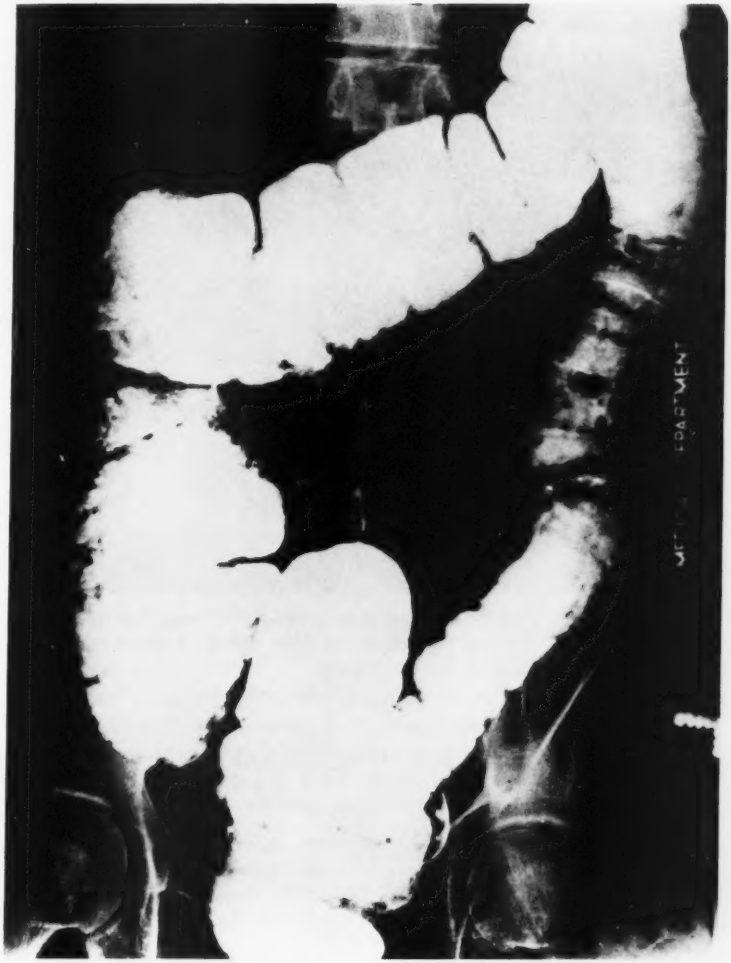

Figure 1 (case 1). Barium enema clearly shows defects in the large bowel, interpreted as multiple polyps.

Case 2. A 30-year-old white man was admitted to this hospital on 7 February 1955 with a diagnosis of polyposis, intestinal, adenomatous. The history of the present illness dated back to 3 years prior to admission, when he had noted a persistent diarrhea with a gradual weight loss from 175 to 115 pounds. He attributed this to the fact that he had been a prisoner of war in Korea at that time, and believed

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that it was due to the constant rice diet. He had not noticed blood in his stools. He was repatriated in September 1953 and with the new diet his bowels moved once a day and his weight increased to 145 pounds.

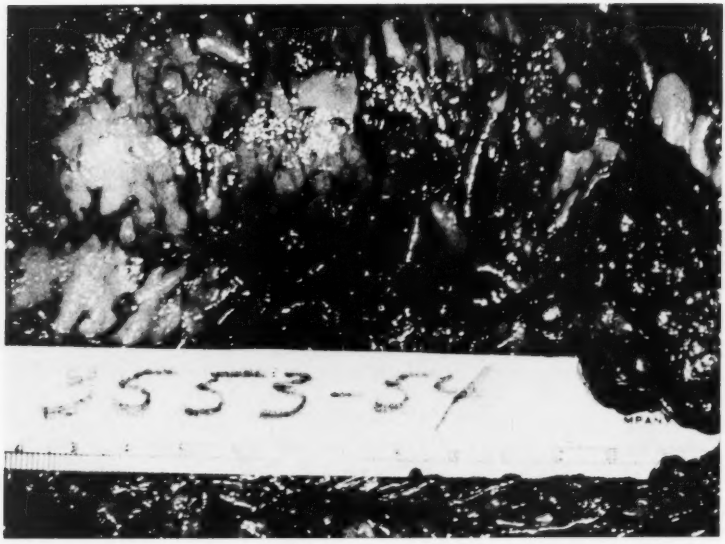

Figure 2 (case 1). Portion of operative specimen of large bowel reveals segment studded with polyps. The entire large bowel presented a similar appearance.

Six months prior to admission he began to have two to three normal movements per day, and noticed a gradual weight loss to 130 pounds. At that time he received a letter from his brother's physician who recommended that he be examined for possible polyposis coli, because his brother had recently undergone a bowel resection for this condition.

The past history and social history were negative. The family history revealed that his mother died at 43 years of age of carcinoma of the large bowel; a sister, 33, had an ileostomy following bowel resection for multiple polyposis; and a brother, 23, has had the same. Of three other siblings, one showed normal findings at examination, the second refused examination, and the patient had no knowledge of the condition of the third. His 3-year-old son was asymptomatic and was not examined.

Findings of a physical examination were negative except that on digital examination of the rectum the tip of the examining finger disclosed granular masses.

Results of a complete blood count, a urinalysis, and serologic tests were normal. Examination of stool specimens were negative for ova and parasites. The roentgenogram of the chest was negative. A barium

enema revealed numerous polyps throughout the entire length of the colon. A sigmoidoscope was passed to 23 cm., and 60 to 80 small polyps were visible throughout the large bowel. On 18 February, under general anesthesia, a total colectomy and resection of the distal ileum was performed. Eleven centimeters of rectum was left and an end-to-end ileoproctostomy was performed, using two layers of sutures.

Upon opening the specimen, the entire colon was studded with polyps so numerous that in some areas they tended to merge. There was no evidence of malignancy in the specimen submitted, and there were no polyps in the ileum.

Postoperatively the patient did very well, with adequate maintenance of fluid balance and a minimal amount of abdominal distention. Three days postoperatively, he had a liquid bowel movement with some blood but this was not alarming. The Miller-Abbott tube was removed on the fourth postoperative day and he began to have as many as seven soft, semisolid bowel movements a day. Three weeks later he was having three formed bowel movements at night and four during the day, and had begun to show some gain in weight.

Four weeks after operation a sigmoidoscope was passed for the first time and at the 11-cm. mark the suture line was found intact. Ten polyps distal to the suture line in the rectum were fulgurated. One week later, 15 more polyps were fulgurated. After a 2-week period, all the remaining polyps were fulgurated, leaving a normal-appearing mucous membrane, and he was discharged from the hospital. Following each of these fulgurations there was some diarrhea but it rapidly subsided. The patient was instructed to return at 3- to 6-month intervals for follow-up sigmoidoscopic examination, at which time any polyps that may have developed will be biopsied and fulgurated. If any malignancy is found, it will be a simple matter to remove the 11 cm. of rectum from below.

The patient is well satisfied with this procedure, especially because he has a brother and sister with ileostomies and can compare his condition with theirs.

ETIOLOGY

It is now a widely accepted fact that familial polyposis is due to a genetic change in a normal, growing cell. Once the mutation has occurred, the trait is transmitted by either sex from one generation to the next as a mendelian dominant. When one ancestor has this dominant characteristic, it is then transmitted down the family tree with every generation affected. McCarty has further proved that the entity occurs in all national groups and that there is no racial predisposition.

SEX, AGE, AND INCIDENCE

In a series of 93 patients published by Mayo and associates[11] no definite sex predominance was noted nor was there any evi-

dence of a sex-linked characteristic. In true familial polyposis, the fact that the disease is hereditary but not congenital is evident in that the symptoms are rarely seen before puberty, and the polyps are not found until puberty. In 1952, Schaffer[12] reviewed the literature and found that up until 1928 Hullsiek[13] had found 128 cases of polyposis coli with a proved familial history. In addition, Schaffer was able to find a total of 107 cases after 1928, including four of his own. This makes a total of 235 cases of proved familial polyposis coli up to 1952. This gives one the impression that the entity is a rare one. However, we do not believe that this is true, but rather, that there are many cases that have not been published because the would-be author has thought that the lesion is an all too common entity. We do not believe that familial polyposis coli is a rarity, but a rather uncommon lesion, and that more cases would be found if a more adequate family history were taken in every case of adenomatous polyps of the large bowel. The average age of onset in Schaffer's patients was 28.9 years and 39 percent of his patients had carcinoma of the large bowel by the time the disease was discovered.

SYMPTOMS AND DIAGNOSIS

The onset of the disease is insidious; often, rectal bleeding is regarded by the patient as evidence of hemorrhoids and no further thought is given to the matter until symptoms of malignant change appear. Early there is crampy abdominal pain with occasional looseness of bowel movements, due probably to hypersecretion and hypermobility. Shortly thereafter mucus and blood are seen. The stools, classically, have blood over the surface rather than mixed throughout. This is supposedly a classical sign, but, because one frequently must question the reliability and credibility of the patient, little value can be placed upon it.

The presumptive diagnosis is based upon the history and rectal examination. The latter will frequently disclose the rectal masses. Confirmatory diagnosis is based upon proctosigmoidoscopic examination and barium enema.

TREATMENT

The treatment of multiple polyposis recommended in this article is total colectomy, including about 5 cm. of ileum, followed by an ileoproctostomy. This procedure is done in one stage following bowel preparation with 0.5 gram of sulfaguanidine 4 times a day for 5 days and 1 gram of neomycin sulfate every 4 to 6 hours for 2 days prior to operation. After 1 month, all of the polyps in the remaining rectal area are fulgurated; the patient is followed at 3- to 6-month intervals by proctoscopic examination, and further fulguration is done as indicated. This procedure is far superior to ileostomy with its many inherent difficulties, and to pull-

through procedures. If the remaining large bowel becomes overrun with polyps, large areas of the mucosa can be excised without difficulty. Not only must the patient be treated and followed adequately but all members of his family should be thoroughly examined, treated if necessary, and followed for the rest of their lives.

Many advocate a Miles' operation and ileostomy, either abdominal or the perineal type, so-called pull-through procedure. We consider this a rather radical procedure unless demanded by the condition of the distal rectum. There are only two clear-cut indications for such a procedure: (1) evidence of malignancy in the rectosigmoid area, and (2) total involvement of the remaining rectal mucosa by polyps. To further elaborate on the latter indication: if there is no normal mucosa between the polyps, the rectosigmoid area should be removed with the balance of the large bowel, and an ileostomy performed.

With an ileoproctostomy the portion of intestine remaining is able to compensate, and electrolyte and fluid balance is maintained. With an ileostomy, this is achieved with difficulty and, in addition, the caustic effect of small-bowel contents upon the skin is well known. Therefore, an ileoproctostomy with preservation of the lower rectum and sphincter is preferred to an ileostomy.

PROGNOSIS

It is a well-substantiated fact that adenomata of the large bowel predispose to carcinoma. Martin[14] stated that any patient who has polyps of the colon or rectum would probably develop carcinoma in 10 years, if he lived. The incidence of carcinoma in multiple polyposis statistically varies between 34.6 percent, as reported by Hullsiek, and 82.8 percent, as reported by Bargen.[15] Estes[16] stated that "the potential incidence of cancer following multiple polyposis should be considered 100 percent." Bernstein[17] stated that "from the accumulated evidence it is quite certain, therefore, that the burden of proof is upon anyone who wishes to prove that colonic or rectal polypi will not, if left untreated, undergo malignant degeneration."

In treated patients, following ileoproctostomy, regularity of bowel habit is quickly re-established. In 6 to 12 months following dietary restrictions, the patients are usually able to tolerate a full diet, so that within 1 year they are able to live a full life.

Statistically, we have little to state concerning the follow-up of familial polyposis after operation, because so few cases have been reported. It has only been in the past 5 to 10 years that the dangers of large bowel surgery have been controlled. This is largely due to the development of antibiotics. Adequate follow-up

of the patients who have been operated on in the past 5 to 10 years should reveal what the results of such treatment will be. However, it is believed that complete removal of the colon, periodic follow-up of the remaining distal rectum, and fulguration of any polyps that may develop offer a safe procedure which is far more satisfactory to the patient than an ileostomy. Adequate removal is considered to be that which leaves no more than 12 cm. of rectum because of the technical difficulty in observing and treating lesions higher than this.

At the risk of repetition, it again must be emphasized that the patient and his family are never free from periodic observation. If the patient co-operates with his physician there is no reason why he may not attain a full life span, and remain symptom-free and comfortable.

SUMMARY

Polyposis of the large intestine may be classified either as adult (acquired) or as adolescent (congenital, disseminated) types. Two cases presented herein illustrate the latter heredofamilial entity, as they occur in patients with typical positive family histories. From a review of the literature it appears that familial polyposis coli is uncommon although not rare, and more cases would be found if a more adequate family history were taken in every case of adenomatous polyps of the large bowel.

The treatment recommended for benign polyposis is total colectomy, including about 5 cm. of ileum, followed by ileoproctostomy. The patient is then re-examined at regular intervals for the rest of his life, at which times new polyps, if they occur, are fulgurated. This procedure is more satisfactory to the patient than the more radical abdominoperineal resection and ileostomy.

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THE PATIENT'S EXPECTATIONS

The average patient appears to expect one of four things from his doctor: (1) some form of medicine, (2) advice or guidance in connection with a particular action or event going on at the time he is attending, (3) support (usually against some member of the family) in some particular action, or (4) "a letter to see a specialist." In addition all want to be told "what is the matter" and, of course, to be reassured that the condition is not serious.

Yet at the end of the first consultation most are content to go away without any of these things if they have an appointment to come again. Despite the usual cry, "The patient expects a bottle of medicine," I have found that if he is given ample time and the opportunity to talk fully, and is thoroughly examined before being told it is necessary to seek the cause of his symptoms by means of further interviews, he is happy to accept this—and there is seldom any later demand for medicine. Similarly, though it is said that the public has become "hospital-conscious" or "specialist-minded," I find that most patients who ask for "a letter to see a specialist" will agree to attend for further discussion of their troubles once they have been encouraged to talk freely.

—PHILIP HOPKINS, M. R. C. S., L. R. C. P.
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Traumatic Aneurysm of the Thoracic Aorta

PAUL F. WARE, *Captain, MC, USAR*
RICHARD H. ADLER, *Captain, MC, USA*
CLINTON S. LYTER, *Colonel, MC, USA*

RECENTLY, traumatic thoracic aortic aneurysm or rupture has been diagnosed more frequently during life. The increasing speed and accident rate with modern transportation undoubtedly accounts for the rising prevalence of traumatic thoracic injuries. Scattered case reports,[1-4] now appearing in the literature, raise many pertinent points regarding their pathogenesis, diagnosis, and treatment. Therefore, a complete understanding of the pathogenesis of such injuries is essential for an accurate diagnosis during life in order to permit definitive treatment.

PATHOGENESIS

Aortic trauma may be due to either penetrating or nonpenetrating injury. Nonpenetrating injury is caused usually by blunt trauma, such as steering-wheel or other crush injuries. The aorta is readily susceptible to the peculiar effects of rapid deceleration alone. Closed chest trauma, involving sudden deceleration, as in car or jeep accidents, parachute jumps, falls from a height, and airplane crashes, accounts for the great majority of thoracic aortic injuries. Hass[5] reported on the pathologic changes found in victims of aircraft accidents and emphasized the stresses placed on unevenly decelerating body organs. The aorta acts like a solid viscus because of its column of blood and tends to decelerate slowly. In addition, the rate of deceleration is retarded at certain anatomic points because the transverse aortic arch is relatively mobile and hangs suspended in the thorax from the great vessels. The aortic arch is comparatively anchored at its left ventricular origin and at its junction with the descending aorta near the insertion of the ligamentum arteriosum. The descending aorta is fixed to a lesser extent by the intercostal arteries. In Strassman's[6] series of 72 cases of traumatic aortic rupture, the sites of rupture in order of frequency were: the first portion of the descending aorta, the proximal aorta just above the aortic cusps, and the descending aorta between the isthmus and the diaphragmatic hiatus. Closed chest trauma, from most causes, basically involves unequal deceleration subjecting the aorta to stretching, torsion, and tearing, especially at the relatively fixed points.

From Fitzsimons Army Hospital, Denver, Colo. Capt. Ware is now at 16 Norwich St., Worcester, Mass.

The type of aortic injury resulting from such forces is variable. If the stress imposed is very severe the mobile aortic isthmus may be torn completely apart at either end with sudden, fatal hemorrhage. A linear tear of the intima may heal spontaneously, give rise to a dissecting aneurysm, or progress to further rupture of the media and form a false aneurysmal sac. A force sufficient to tear both intima and media may lead to progressive dissection and stretching of the adventitial layer with formation of a false aneurysm. The torn intima and media may retract a considerable distance leaving a false fibrous aortic wall or sac as the lesion stabilizes. The laceration is usually transverse and occurs most commonly near the ligamentum arteriosum. If an aneurysm is formed, it is usually posterolateral in position and grossly resembles a saccular type of aneurysm. This appearance, however, is deceptive and there are certain fundamental differences between a traumatic aneurysm and a classical syphilitic saccular aneurysm which have a practical bearing on surgical treatment. Fractures of the bony thorax, injuries of the heart, lung, and extrathoracic organs may be associated with the aortic lesion.

CLINICAL COURSE

The clinical course of a patient with aortic trauma may pursue one of several pathways. Immediate death from hemorrhage may occur from complete laceration while partial laceration may result in a localized unsuspected aneurysm discovered on routine chest examination. Partial laceration results in variable degrees of localization of the extravasating blood. Temporary localization, by a thin adventitial layer, the lung, or mediastinal structures, may occur with exsanguinating hemorrhage hours or days later; or the extravasated blood may become firmly localized, forming a false aneurysm. This latter group of patients must be diagnosed accurately to prevent a fatal outcome.

DIAGNOSIS

Diagnosis is relatively simple if clinical suspicion is high. The patient presenting a history of thoracic trauma requires careful observation both clinically and radiologically. Serial roentgenograms may reveal progressive mediastinal widening, increased aortic density or "layering"[7] due to adventitial dissection, or an irregular mediastinal shadow due to extravasating blood. There may also be associated lung injury with the findings of hemopneumothorax.

PHYSIOLOGIC CONSIDERATIONS

The period of aortic occlusion tolerated by human patients without neurologic damage is variable and depends on individual collateral circulation. Patients with coarctation of the aorta usually possess excellent collateral circulation and safely toler-

ate aortic occlusion for long periods. Even these patients, however, may not have the aorta occluded with impunity if critical collaterals are sacrificed. The patients reported by Beattie and co-workers[8] and Bing and associates[9] suffered paralysis after the subclavian artery was turned down into the aorta below the area of coarctation.

Two methods, used singly or in combination, are available to protect the heart and distal organs from the untoward effects of aortic cross-clamping: (1) an artificial collateral circulation supplied by a shunt, and (2) hypothermia to reduce the workload of the heart and diminish the tissue oxygen requirements.

A practical external shunt was devised by Clatworthy and Varco in 1950.[10] Blood was shunted around an occluded aortic area, through a siliconized polyethylene tube. This shunt prevented the mechanical shock observed in dogs undergoing aortic cross-clamping without such protection. Schafer and associates[11,12] used this method in both dogs and humans to replace resected aortic segments with a new graft. Izant and associates[13] used double-flanged, stainless steel tubes connected as an external shunt. Stranahan and associates[14] shunted blood through Tygon tubing with siliconized glass joints. Mahorner and Spencer[15] used the graft which is to replace the excised aortic segment as the shunt itself.

Numerous studies of the physiologic effects of aortic cross-clamping have been carried out. Page[16] demonstrated that collateral circulation prevents proximal hypertension when the aortic arch is first partially then completely constricted. Van Harreveld and associates,[17] in 1949, demonstrated in experiments that sudden complete aortic occlusion just above the renal artery is without effect, whereas compression above the celiac axis or above the diaphragm causes an immediate rise in arterial pressure as does occlusion of still more central aortic regions. Reduction of the thoracic aortic lumen of over 45 percent is required before arterial pressures in the aorta or femoral artery are affected.[18] The studies of Hubay and associates[19] emphasize the importance of the shunt lumen approximating the cross-sectional areas of the bypassed vessel to minimize the physiologic alterations. Other studies revealed that small, long, or multiple shunts, offering increased resistance, may not serve as adequate collateral channels. Schafer and co-workers,[11,12] using multiple polyethylene shunts, found partial occlusion of the inferior vena cava also necessary to prevent overloading the left ventricle.

The basic physiologic studies of hypothermia initiated by Bigelow and associates[20] have focused attention on the use of body cooling to minimize the problems associated with aortic

cross-clamping. Owen and co-workers[21] recently concluded from a series of 16 hypothermic (23° to 26° C.) dogs that thoracic aortic cross-clamping for periods up to 2 hours during hypothermia was safe. Pontius and associates,[22] in cross-clamping the aorta, found only a slight reduction in over-all mortality in hypothermic dogs but demonstrated no evidence of paraplegia in them, while 65 percent of the control normal thermic animals developed paraplegia. Their study suggests that hypothermia may avoid ischemic changes below the area of aortic occlusion, but offers little or no protection against the immediate cardiodynamic effects.

CASE REPORT

The patient, a 19-year-old soldier, was transferred to this hospital on 19 November 1954 with a referring diagnosis of traumatic aneurysm of the thoracic aorta. He had been involved in an automobile accident on 12 September and had been hospitalized elsewhere because of multiple rib fractures on the left, associated with a left hemopneumothorax which had been managed satisfactorily by aspirations. He was discharged after 3 weeks, but because of dyspnea on mild exertion, easy fatigue, palpitation, and occasional aching on the left side of the chest, he was unable to perform duty and was transferred to this hospital for evaluation.

The patient was tall and thin and in no acute distress. All peripheral pulses and blood pressures were normal. A grade II systolic murmur was heard on both sides of the spine posteriorly, but was more marked on the left. Electrocardiographic findings were within normal limits. A roentgenogram and fluoroscopy revealed a pulsatile paramediastinal mass lying posterolaterally in the left side of the chest in intimate relation with the proximal descending aorta. An angiocardiogram did not reveal any contrast material entering the mass.

The development of the aortic aneurysm can be followed by review of the roentgenograms made during the initial 2-week posttraumatic period (figs. 1-4). On serial roentgenograms the aneurysm appeared slightly larger (fig. 5).

The use of hypothermia and an external aortic shunt were believed to offer maximal protection during the contemplated period of aortic cross-clamping. Accordingly, on 29 December anesthesia was induced, and under hypothermia the aneurysm was excised and replaced by a homologous aortic graft. The patient's temperature was maintained between 80° and 82° F. throughout the operative procedure by an underlying cold-water, rubber mattress after hypothermia was induced by immersion in an ice tub. Adequate exposure was obtained through the bed of the left fourth rib with shingling of the third, fifth, and sixth ribs. The aneurysmal mass was found to arise about 1.5 cm. distal to the left subclavian artery and presented in a posterolateral position. There was tremendous fibrotic reaction about the aneurysm, the left

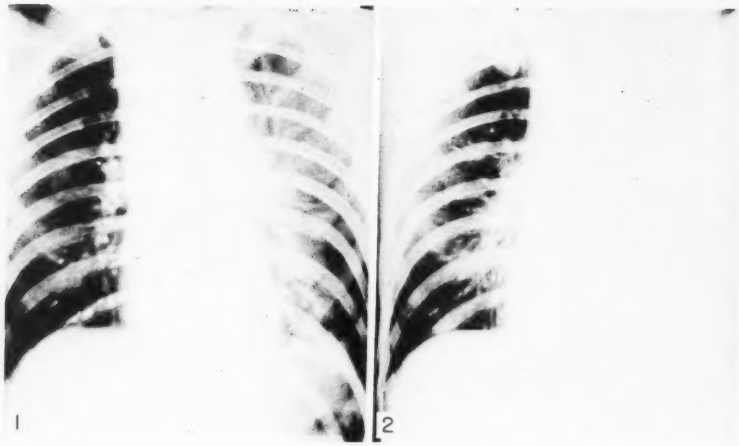


Figure 1. Roentgenogram of 12 September 1954 showing mediastinal widening and contused left lung. Figure 2. Extensive left hemothorax is demonstrated on 13 September 1954.

lung, and the mediastinal structures from previous mediastinal and pleural bleeding. The anatomic cleavage planes were essentially obliterated, and the extremely indurated tissues yielded, in some areas, only to sharp-knife dissection. First, the left subclavian artery and aortic arch proximal to the aneurysm were dissected free and encircled by umbilical tapes. A partially obliterated patent ductus was divided by the method of Gross.[23] A section of aorta distal to the aneurysm was next isolated and likewise encircled with tape. The subclavian artery was occluded and a heterologous (dog) arterial sleeve was anastomosed to the side of the subclavian artery. A similar heterologous arterial sleeve was anastomosed to the distal aorta. A curved Pott's clamp allowed suture of the distal aorta without occlusion. The heterologous grafts were then connected by flanged siliconized polythene shunt tubes (figs. 6 and 7) which had a combined internal diameter of 7 mm. Pott's clamps were then placed on normal aorta proximal and distal to the aneurysm and the proximal aorta transected just above the aneurysm. The intense fibrosis made excision of the aneurysm hazardous because of the intimate involvement of the left atrial wall, the left pulmonary artery, the left main bronchus, esophagus, and inferior pulmonary vein. A 3-cm. area of esophageal muscularis, incorporated in fibrous reaction, was inadvertently removed during the extensive dissection necessary to remove the aneurysm, leaving a 1-mm. perforation in the underlying mucosa. This opening was sutured and the denuded esophagus covered by adjacent pleura and lung. After excising the aneurysm, the two ends of normal aorta were bridged by a 16-cm. lyophilized homologous aortic graft. Anastomosis was performed by short lengths of continuous everting No. 00000 silk mattress sutures interspaced with single interrupted everting mattress sutures

Figure 3. The roentgenogram made on 23 September 1954 reveals improvement of the left hemopneumothorax following repeated thoracenteses. Figure 4. Presence of some loculated fluid, subsidence of the mediastinal reaction, and early aneurysmal dilatation are noted in this roentgenogram of 1 October 1954.

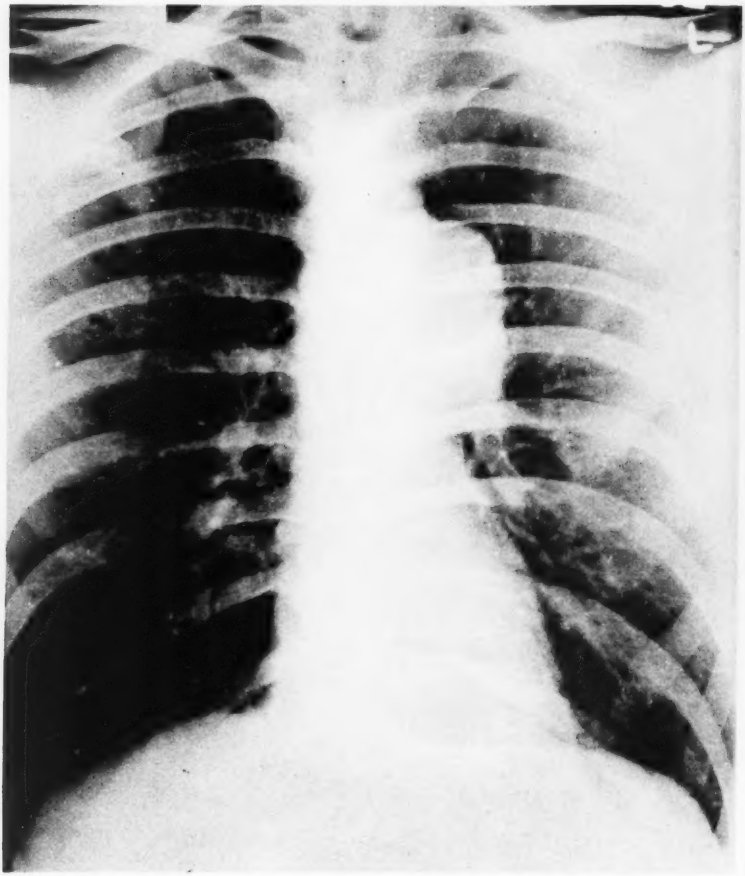
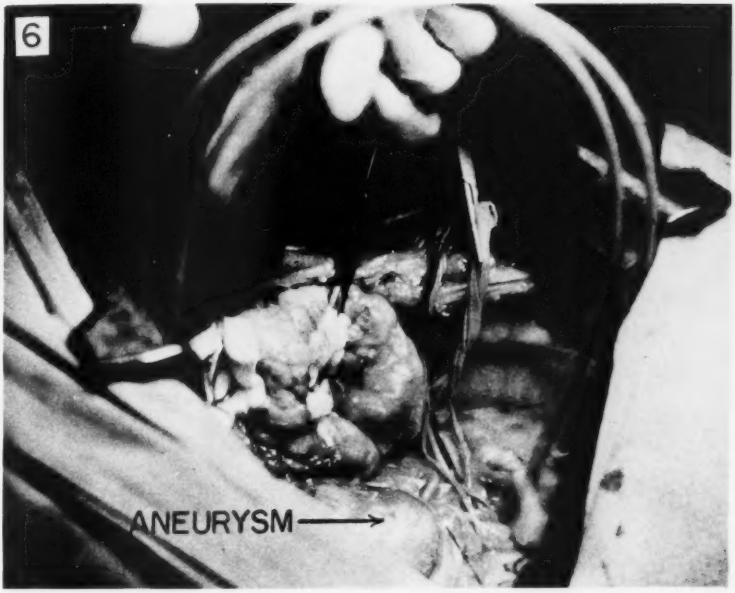


Figure 5. The roentgenogram of 26 November 1954 reveals a well-established posttraumatic aortic aneurysm in the classical position.

of the same material. Even the normal host aorta had considerable adventitial fibrotic thickening. After the proximal clamp was completely opened, a small opening on the posteromedial aspect of the anastomosis required additional suture and oxycel (brand of oxidized cellulose) for hemostasis. Following restoration of good blood flow through the homologous aortic graft, the shunts were removed by ligating and transfixing the left subclavian artery and resuturing the distal aortic opening within the curve of a Pott's clamp. The operative procedure was 10½ hours long. The shunt functioned well throughout the 3½-hour period of aortic occlusion, and there was no evidence at any time of cardiac embarrassment. The patient received a total of 21 pints of blood.



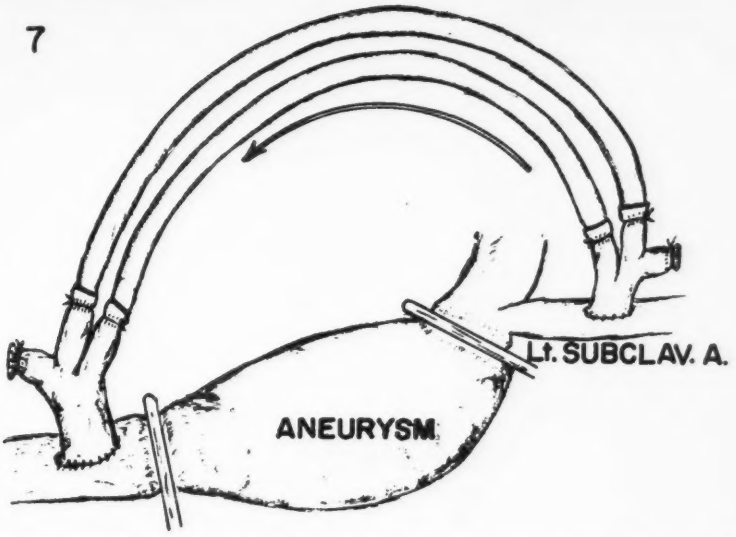


Figure 6. Photograph taken during the operation, showing functioning shunt. The superior edge of the aneurysm is visible. Figure 7. Diagram showing relationship of aneurysm, heterologous arterial sleeves, and polythene shunt.

The patient's first three postoperative days were uneventful. He had good femoral pulses, an excellent urinary output and a clear sensorium. On the fourth postoperative day a small apical pneumothorax and a mediastinal air pocket were noted (fig. 8). Methylene blue, administered

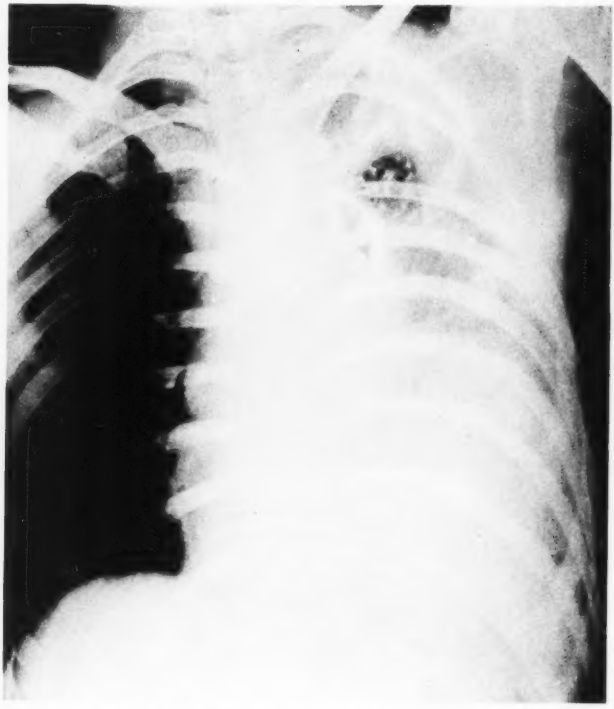


Figure 8. Roentgenogram, made on 2 January 1955, the fourth postoperative day, showing a mediastinal air pocket and incompletely expanded left lung.

orally, was recovered from the thoracotomy tubes, confirming the suspected esophageal fistula. Gastric decompression was maintained through a small tube, and the left lung completely re-expanded after the insertion of a new apical thoracotomy tube. The patient's condition deteriorated very rapidly from the effects of the esophago-pleural fistula, and no serious consideration could be given to repeat thoracotomy. On the sixth postoperative day the patient was in profound shock and required continuous intravenous norepinephrine therapy. A roentgenogram at this time revealed good expansion of the left lung with no evidence of mediastinal pocketing. The patient died on the seventh postoperative day in irreversible shock. Eight hours before death, freshly clotted blood due to leakage from the anastomotic suture line secondary to the mediastinitis was obtained from the thoracotomy tube.

At autopsy the esophageal perforation causing an extensive mediastinitis and pleuritis was confirmed (fig. 9). The aortic graft and suture lines (fig. 10) were intact except for one small area of leakage in the proximal suture line, presumably the result of the surrounding infection. Postmortem findings otherwise were not remarkable.

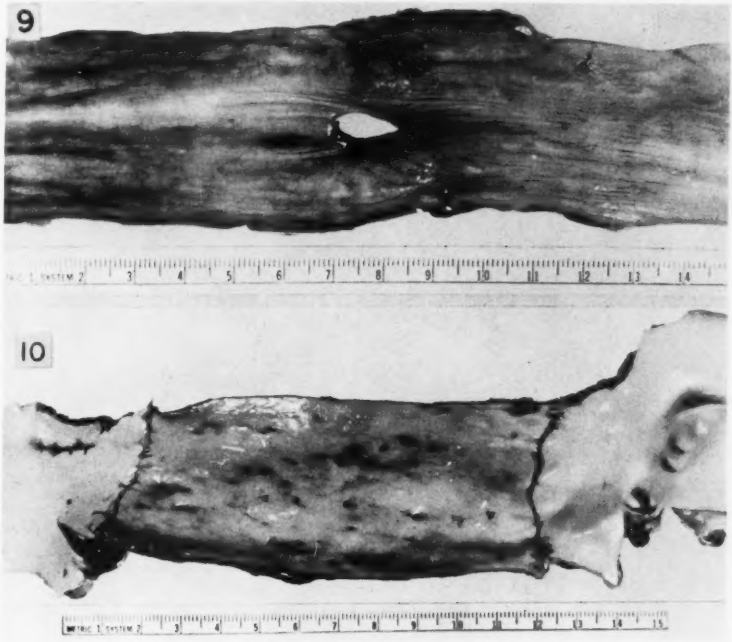


Figure 9. Postmortem mucosal view of esophageal perforation. Figure 10. Postmortem photograph of the homologous aortic graft bridging normal aortic wall.

PATHOLOGY

Few traumatic thoracic aortic aneurysms have been studied carefully pathologically after surgical resection. External examination of such an aneurysm at operation may be misleading. Study of an open resected specimen, including sac and involved aorta, provides a more complete understanding of the basic underlying lesion. A traumatic aortic aneurysm, unlike its syphilitic counterpart, is not a sharply localized pathologic defect. The lacerated intima and media retract as much as several centimeters with disruption of elastic fibers leaving a defect bridged only by fibrous tissue.

The fundamental features of traumatic aortic aneurysm are illustrated in figures 11 through 15. These findings have also been demonstrated by Stryker.[24]

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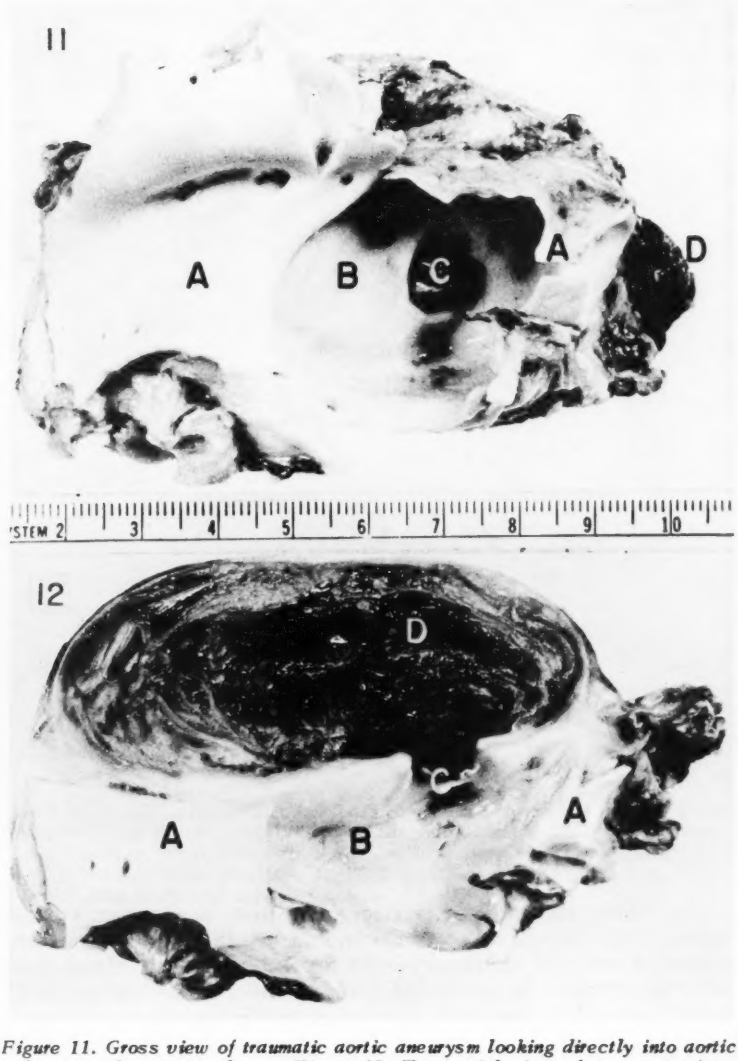

Figure 11. Gross view of traumatic aortic aneurysm looking directly into aortic lumen and aneurysmal sac. Figure 12. Tangential view of gross specimen of aorta and false sac. (A) *Normal aortic wall.* (B) *Fibrous tissue defect left by retraction of lacerated aorta.* (C) *Fibrous tissue rent connecting aortic lumen with false sac.* (D) *False sac and laminated clot.*

DISCUSSION

More patients receiving severe closed chest trauma associated with sudden deceleration are being seen and, with vigorous treat-

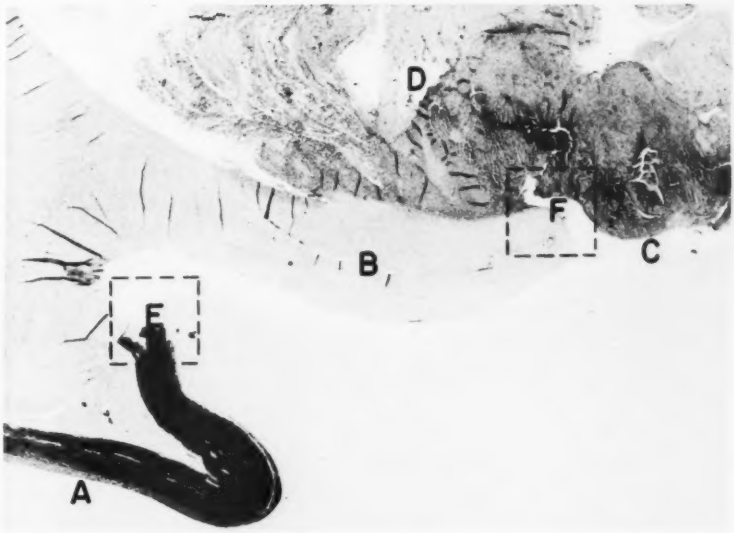

Figure 13. Sagittal section through normal aortic wall, fibrous wall, and opening, into false sac. (See legend for fig. 12 for explanation of A *through* D.) (E) *The end of normal aortic wall with disrupted elastic fibers. (See fig. 14.)* (F) *Edge of fibrous tissue defect and laminated clot. (See fig. 15.) (Verhoeff's elastic tissue stain)*

ment, are surviving and presenting problems such as an aortic aneurysm. Such an aneurysm, if discovered years later on routine chest roentgenograms, may perhaps be treated expectantly if there are no untoward signs of progression or related symptoms.

The immediate prognosis for the patient with a recently acquired thoracic aortic aneurysm is very poor, and few patients survive the first 24 hours. Indeed, in Strassman's 69 cases of traumatic thoracic aortic rupture, 83 percent of the patients died within 1 hour, and all died within 18 hours of the accident. Kastl's[25] patient lived 10 days. Rice and Wittstruck's[26] patient survived 20 days, but the patient reported by Hollingsworth and associates[1] lived 7 years. If the patient's condition can be stabilized in the first few hours and associated injuries permit, exploratory thoracotomy should be considered seriously. If operation is undertaken a definitive procedure with grafting, if indicated, may be necessary, but simple aortic suture may suffice, as indicated by the reports of Blalock,[27] Elkin,[28] and Beattie and Greer.[29]

A third group of patients survive the initial trauma and associated injuries, and weeks to months later are essentially well except for a localized thoracic aortic aneurysm. To regard this

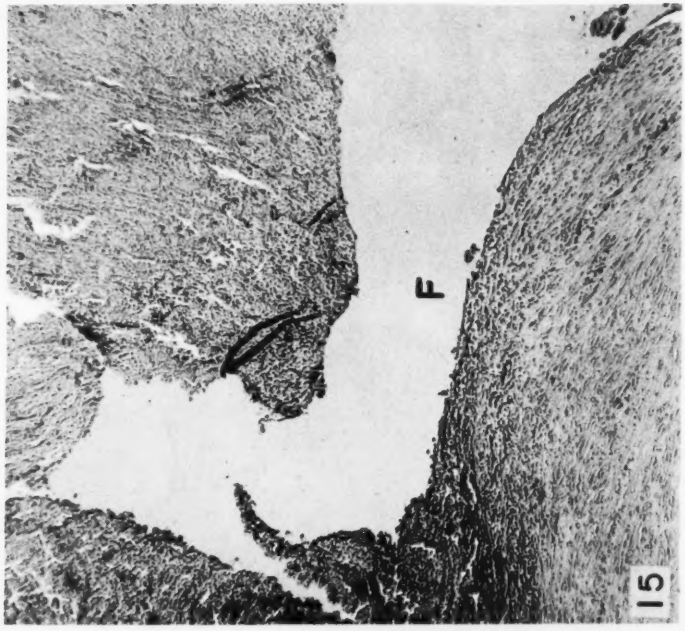

Figure 14. High-power view showing disrupted elastic fibers and end of normal aortic wall. (Verhoeff's elastic tissue stain) Figure 15. High-power view of edge of fibrous tissue defect leading into false sac and laminated clot.

posttraumatic aneurysm as identical with a true saccular small-necked aneurysm of syphilitic origin is appealing. Clamping of the base of the sac, with excision of the main aneurysmal mass, and suture closure does not require interruption of aortic blood flow. This approach, successful to date, in a posttraumatic aortic aneurysm, has been reported by Bahnson.[3] A similar approach was unsuccessful in the case reported by Goyette and associates,[4] and recurrence of an aneurysm 6 months following a similar procedure has been reported by Cooley and DeBakey.[10] Pathologically, however, as we have seen, there is usually actual rupture and pulling apart of the intima and media with retraction of the layers for a distance of several centimeters. This gap, devoid of elastic fibers, is bridged only by fibrous tissue. These features, peculiar to a posttraumatic aneurysm, may not be appreciated at the time of operation. Clamping, excision, and resuturing through such fibrous tissue would seem to preclude a long-term satisfactory result in a high-pressure, vascular channel such as the thoracic aorta. Rather, a definitive procedure involving resection to normal aorta with grafting seems preferable.

Hypothermia with a protecting shunt seems indicated to avoid the inherent hazards of aortic occlusion in these patients. The hypothermia need not be extreme, but may be maintained between 80° and 84° F. to minimize myocardial irritability and a potentially difficult resuscitation if ventricular fibrillation should ensue.

The ribs should be spread open slowly to avoid tearing the posterior aspect of the aneurysm where its limiting tissues may be thin and friable. The aneurysm, *per se,* should be left alone to avoid troublesome oozing and alveolar leaks from the intimately adherent lung. Softened areas in the aneurysm may actually be buttressed by lung parenchyma, and dissection may lead to potentially uncontrollable hemorrhage. Therefore, the aorta is first exposed proximal to the origin of the aneurysm. The previous mediastinal and pleural bleeding leaves a residual fibrosis rendering all dissection hazardous until one has achieved satisfactory control of the aorta above and below the aneurysm. An external shunt to bypass the aneurysm is readily established without even momentary interruption of aortic blood flow. A heterologous arterial sleeve is sutured in position in the distal aorta and also in the subclavian artery. A siliconized, polyethylene, flanged tube may be simply tied into these arterial cuffs. The arterial sleeves have the advantage of mobility and permit the shunt to be moved out of the operative field. Ideally, the size of the shunt under normothermic conditions should approximate the estimated cross-sectional area of the thoracic aorta. Practically, from the studies of Gupta and Wiggers,[16] it would seem that a shunt half this size would be adequate. The decreased

cardiac output and lowered oxygen requirements of tissue cells under hypothermia add a further margin of safety. The size of lumen of the shunt used in our patient was critical and, undoubtedly, hypothermia contributed to the safe aortic occlusion of over 3 hours' duration.

Once the shunt is functioning satisfactorily, the aorta may be cross-clamped with impunity. The entire aneurysm should now be removed to avoid late slough and abscess formation, as reported by Lam and Aram.[31] The surgical error in our patient resulted from inability to find any cleavage plane between the medial wall of the aneurysm and certain mediastinal structures. Indeed, too extensive a dissection may lead to impairment of the esophageal blood supply or injure the esophagus and other contiguous structures. A safer approach would be to open the aneurysm longitudinally on its lateral aspect and, with a finger in the lumen, excise the intima and media on its medial aspect under direct vision, leaving the adherent adventitia and mediastinal tissue reaction intact over vital mediastinal structures. Thus, potential injury to the esophagus, left main bronchus, pulmonary artery, inferior pulmonary vein, and left auricular wall would be minimized. An indwelling gastric tube would be an additional precautionary measure.

The traumatized aorta with its accompanying aneurysm is excised to grossly normal aortic wall proximally and distally. The intervening defect may be bridged by a freeze-dried aortic graft or a suitably fashioned prosthesis of one of the newer nylon-type synthetic fabrics. After completion of the anastomosis and restoration of aortic blood flow, the distal aorta is resutured and the subclavian artery may be reconstituted or ligated and transfixed. An additional point, perhaps related to hypothermic anesthesia, deserves mention. Due to our present interest in fibrinolysis in thoracic surgical patients,[32] routine investigative blood specimens were drawn for fibrinogen levels. Intense fibrinolytic activity was noted when the patient was placed in the ice-water tub and again later when blood replacement fell behind momentarily. The fibrinolytic activity spontaneously subsided in each instance, but excessive fibrinolysis should be considered if unusual oozing occurs because intravenous fibrinogen fraction may restore a normal clotting mechanism.

SUMMARY

The incidence of traumatic thoracic aortic aneurysm is increasing. The lesion may be caused by closed chest trauma and rapid body deceleration. Early accurate diagnosis is essential to permit definitive treatment.

The reported case illustrates the development of the lesion radiographically. The basic pathologic changes are documented

and their relation to the choice of surgical therapy discussed. Complete resection of the aneurysm to normal aorta would seem to ensure the best long-term result.

In the light of present knowledge, resection of a traumatic aneurysm requires an external shunt and hypothermia to afford maximum protection against deleterious cardiodynamic effects and distal ischemic changes during aortic occlusion.

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WIDOWS INCREASING IN NUMBER

As a result of the marked decline in mortality, the *proportion* widowed in the population has been decreasing at every period of life. Nevertheless, the *number* of widows in our country has been mounting rapidly, because the population at the older ages has been growing and because mortality has improved more rapidly among women than among men. In 1953 there were 7.4 million widows in the United States, compared with 5.7 million in 1940 and less than 4 million in 1920. Thus, between 1920 and 1953 the number of widows rose by almost 90 percent, while the adult female population showed a gain of 63 percent . . . . Currently, at least one woman in every 10 at ages 45-54 is a widow; at ages 55-64 the proportion is more than one in every four. Almost one woman in every two who now becomes widowed still has more than 20 years of life ahead of her.

—*Statistical Bulletin*
pp. 6-8, Jan. 1955

A MESSAGE FROM THE A. M. A.

This is the second part of a report on the results of a continuing opinion survey of physicians released from active military service. The first part appeared in the October issue of the *Armed Forces Medical Journal*. The summary covers the reporting period from 1 July to 31 December 1954, during which time the Council on National Defense of the American Medical Association distributed 2,373 questionnaires. A total of 1,500 forms were completed and returned for tabulation.

Training received while in service. Approximately two thirds of the 1,500 responding physicians replied to this question. There were 412 in the Army, 276 in the Navy, and 251 in the Air Force who reported that they received additional training or experience in service schools. The Medical Field Service School accounted for the largest number, while the School of Aviation Medicine and the Amphibious Forces Training School were next in order of attendance.

Evaluation of military medical training. A big majority of the responding physicians felt that all important features of military medical training had been satisfactorily covered. Satisfactory responses were 83.6 percent for the Air Force, 77 percent for the Army, and 70.6 percent for the Navy. Insufficient training in military customs and regulations accounted for the largest number in the Army who were not satisfied with the training programs, while for the Navy and Air Force it was insufficient training in base orientation and indoctrination.

Physicians' evaluation of assignment. A large majority of the physicians indicated they were properly assigned. A less decisive majority in the Army and Air Force responded favorably to the question as to whether they were properly rotated. For the Air Force 82.7 percent indicated a proper assignment and 77.3 percent were satisfied with their assignment. For the Army 77.1 percent indicated proper assignment and 73.6 percent were satisfied, while in the Navy 66.7 percent indicated a proper assignment and 68.4 percent were satisfied.

Physicians' evaluation of staffing conditions. This multiple-answer question requested an opinion as to staffing conditions of nurses, enlisted medical personnel, dentists, physicians, and

From the Council on National Defense of the American Medical Association. The views and opinions expressed are not necessarily those of the Department of Defense. —*Editor.*

others at the installation where service was performed by the responding physician. For all three branches of service, the largest number of responses indicated adequate staffing. By services, 389 Army responses indicated overstaffing, 434 understaffing, and 1,136 adequate staffing. Among the Navy replies, 570 indicated overstaffing, 466 understaffing, and 1,334 adequate staffing. In the Air Force, 284 indicated overstaffing, 413 understaffing, and 684 adequate staffing. By groups, physician overstaffing was greater in the Army and Navy, while in the Air Force physicians were on a par with dentists. The largest understaffed group in the Army and Air Force was nurses. In the Navy dentists led nurses by a small percent in understaffing.

Medical duties performed by others. A total of 1,380 physicians answered this question. The replies showed that 46.1 percent thought that their duties could not have been performed adequately by other personnel, while 53.9 percent felt their duties could have been adequately performed by other personnel. More than 50 percent of the physicians who indicated a possible transfer of their duties to others considered that civilian physicians could adequately provide the medical services.

Types of patients treated. One of the questions was designed to determine the percentage of time devoted by physicians to military personnel, dependents of military personnel, administrative duties, et cetera, both at domestic and overseas stations. Approximately 50 percent of the responding physicians said they devoted one half or more of their time to military personnel both at domestic and overseas stations. One half or more of the time allotted to dependents of military personnel at domestic stations was indicated by 28.2 percent of the replying physicians, and at overseas stations by 34.8 percent.

Types of nonmilitary medical care. The type of medical care most frequently performed by medical officers for nonmilitary persons was outpatient care. For the Army, "other specialty services" was second in order of frequency, with surgery third. For the Navy and Air Force, "obstetrics and gynecology" was second; with "other specialty services" third in order for the Navy, and "pediatrics" third for the Air Force.

Physicians who would voluntarily remain in service. In response to the question relative to military service beyond the obligated tour of duty, 373 physicians indicated they would not be willing to stay in military service for more than their obligated period under any circumstances. A total of 816 physicians indicated they would serve an additional period under certain conditions.

PROMOTIONS OF OFFICERS

The following officers of the military medical services on active duty in the Army, Navy, and Air Force have recently received *permanent* promotions to the rank indicated:

Medical Corps

Howard G. Abbott, Capt., USA
Fae M. Adams, Capt., USA
Eric I. Anderson, Capt., USA
Raymond H. Bishop, Jr., Capt., USA
Robert J. Bradley, Maj., USA
James L. Breen, Capt., USA
Claude M. Cupp, Capt., USA
David S. Cooper, Capt., USA
Estis G. Copen, Capt., USA
Dana D. Cox, Capt., USA
Stephen W. Czarnecki, Capt., USA
Michael R. Ferrell, Capt., USA
James P. Geiger, Capt., USA
Earl S. Gerard, Capt., USA
Alphonse C. Gomez, Capt., USA
Earl W. Gorby, Capt., USA
Homer H. Hanna, Capt., USA
Robert F. Horseman, Maj., USA
William J. Jaffurs, Capt., USA
Edward S. Konwinski, Capt., USA
Arlan P. Larson, Capt., USA
Lloyd B. McCabe, Capt., USA
Eugene P. McKeown, Capt., USA
Stephen Mourat, Maj., USA
Robert W. Neidlinger, Capt., USA
Francis W. Pedrotty, Jr., Capt., USA
James W. Ransone, Capt., USA
John W. Schulte, Capt., USA
Paul E. Siebert, Capt., USA
George M. Stewart, Capt., USA
James A. Stokes, Capt., USA
Paul A. Thomas, Jr., Capt., USA
Robert C. Wever, Capt., USA

Dental Corps

George Geller, Jr., Capt., USA
Clarence W. Gillinger, Col., USAF
Charles M. Hare, Capt., USA
Robert J. Millard, Capt., USA
Raymond H. Osterholtz, Capt., USA
Theodore J. Post, Col., USA
William M. Ream, Lt. Col., USA
John F. Schmitz, Capt., USA
Fred Schneider, Capt., USA
Donald E. Schwartz, Capt., USA
Charles F. Sumner, Capt., USA
George I. Uohara, Capt., USA
Ross W. Warren, Capt., USA
Hal C. Worcester, Capt., USA

Veterinary Corps

Wallace I. Anthony, Capt., USA
Charles M. Barnes, Capt., USAF
Charlie N. Barron, Capt., USAF
Milton A. Beerwinkle, Capt., USA
John H. Benson, Capt., USA
Rodney S. Billett, Capt., USA
Kenneth F. Burns, Maj., USA
Ieland B. Carter, Capt., USA
Irven R. Cooper, Jr., Capt., USA
Walter T. Carll, Lt. Col., USA
Robert A. Crandell, Capt., USAF
Frank J. Davies, Maj., USA
Harold M. Deane, Maj., USA
Duane F. Ford, Capt., USA
Floris M. Garner, Capt., USA
William S. Gochenour, Jr., Maj., USA
Thomas P. Griffin, Capt., USAF
William V. Howells, Capt., USAF
Donald C. Houk, Capt., USAF
Kay W. Lorentzen, Capt., USA
Stewart J. McConnell, Capt., USA
Murlin L. McGown, Capt., USAF
Robert R. Miller, Col., USAF
Max M. Nold, Capt., USAF
Thomas G. Nurnane, Jr., Capt., USA
Gene C. Phelps, Capt., USAF
Gilbert L. Raulston, Capt., USA
William E. Riley, Capt., USA
Charles E. Robinson, Col., USAF
William W. Rosser, Capt., USA
James M. Shuler, 1st Lt., USAF
Howard B. Slider, Jr., Capt., USA

Veterinary Corps—Continued

John L. Terry, Jr., Capt., USAF
Francis L. Thomas, Capt., USA
James B. Young, Capt., USA
Robert J. Young, Capt., USAF
Neil O. Wilson, Col., USA

Medical Service Corps

Bernard Aabel, Col., USA
Erwin R. Archibald, 1st Lt., USAF
William W. Barnes, 1st Lt., USA
Carrol C. Barrick, Col., USA
John W. Barron, 1st Lt., USA
Edgar A. Blair, Col., USA
Allen J. Blake, Col., USA
Lavern G. Borg, 1st Lt., USA
Harold Borko, Capt., USA
William L. Bost, Capt., USA
Theodore E. Brenner, 1st Lt., USAF
Ariben W. Brunnemann, Lt. Col., USAF
Francis A. Buckeridge, 1st Lt., USAF
James C. Burke, 1st Lt., USA
Francis M. Canter, Capt., USA
Eugenia Clayton, 1st Lt., USAF
Maxwell A. Cook, Capt., USA
Raymond J. Cook, Capt., USAF
Richard A. Cook, Capt., USA
Eugene G. Cooper, Col., USA
Robert H. Cortner, 1st Lt., USAF
Allen R. Crow, Col., USAF
Eli E. Daman, Col., USA
Franklin L. Davis, Jr., Col., USAF
Scott H. Davis, Maj., USA
John A. Deakins, Capt., USA
John P. Devlin, Capt., USA
Fred H. Diercks, Capt., USA
Frank R. Foley, Capt., USAF
Louis H. Foubare, Capt., USA
William L. Freeman, 1st Lt., USA
William M. Gordon, Maj., USA
Alfons A. Grigas, 1st Lt., USA
Stanley R. Haskins, 1st Lt., USA
Bryce O. Hartman, Capt., USA
Lewis L. Hawkins, 1st Lt., USA
Robert A. Hedeen, 1st Lt., USA
Frank Herbert, Jr., Capt., USA
Guy C. Hill, Col., USA
Jerome A. Hirsch, 1st Lt., USAF
Francis L. Holihan, Capt., USAF
Rufus D. Huff, Col., USA
Henry A. Huggins, Jr., 1st Lt., USAF
Russell I. Jenkins, 1st Lt., USA
Aaron B. Johnson, 1st Lt., USA
Ernest O. Jones, Capt., USA
Lorenzo K. Kimball, Capt., USAF
Paul W. King, Lt. Col., USAF
Ernest T. Kretschmer, Lt. Col., USAF
Carl G. Lauterbach, Capt., USA
Harland W. Layer, Col., USA
Bertram G. Leach, 1st Lt., USA
Herman I. Little, Capt., USAF
Jack P. Love, Maj., USA
Francis M. Lunnie, Lt. Col., USAF
James H. Mackin, Col., USA
Everett W. Malone, Maj., USA
Adrian D. Mandel, Capt., USA
Carlyle S. Marchek, Col., USA
Kenneth L. Marolf, Capt., USAF
Roy D. Maxwell, Col., USA
Warner D. McClure, 1st Lt., USA
Joseph G. McGlade, 1st Lt., USA
James J. McInerney, Lt. Col., USAF
George H. McLain, 1st Lt., USAF
Marion H. Mixson, Jr., 1st Lt., USAF
Ralph W. Morgan, Capt., USA
Louis H. Muschel, Maj., USA
Carlos E. Newton, Jr., Capt., USA
Wesley R. Nowell, Capt., USAF
Ralph E. Paige, Col., USA
Gene H. Parker, 1st Lt., USAF
Everett W. Partin, Col., USA
Earle A. Paxson, Capt., USA
Robert B. Payne, Lt. Col., USAF
Carl M. Prince, Col., USA
Robert J. Pursley, 1st Lt., USA
Gerald A. Ramthun, 1st Lt., USA
Arin F. Robinson, Jr., Capt., USA
William S. Rooney, Capt., USA
Roman B. Rutkowski, 1st Lt., USA
Lee I. Saul, Capt., USAF
Edgar H. Schein, Capt., USA
Hanssen Schenker, Capt., USA
Ernest T. Sheen, Col., USA
Dana S. Slack, 1st Lt., USA
Frederick B. St. John, Capt., USA
Harold Stone, Capt., USA
Adolph H. Swimmer, Capt., USAF
Leon T. Tayloe, Capt., USAF
Dale L. Thompson, Col., USA
Donald L. Umphress, Lt. Col., USAF
Stanley J. Weidenkopf, Col., USA
Edward S. Wilbarger, Jr., 1st Lt., USA
Vern M. Williams, Jr., 1st Lt., USA
Henry M. Woolf, Capt., USAF
Lester J. Wright, Maj., USA
Leonard P. Zagelow, Col., USAF
Billy B. Zellers, Capt., USAF
William M. Zollman, Jr., 1st Lt., USA

Nurse Corps

Erline T. Aycock, 1st Lt., USA
Jane C. Bess, 1st Lt., USA
Beverly E. Bochman, 1st Lt., USA
Marguerite C. Casey, 1st Lt., USA
Donna M. Christensen, 1st Lt., USA
Betty L. Davis, 1st Lt., USA
Ramona E. DeLaney, 1st Lt., USA
Mary E. Doyle, 1st Lt., USA
Vivian Farland, 1st Lt., USA
Mildred C. Fritz, 1st Lt., USA
Shirley M. Gilson, 1st Lt., USA
Dorothy M. Holtz, 1st Lt., USA
Rosemary Houdek, 1st Lt., USA
Helen M. Kane, 1st Lt., USA
Wanda M. King, 1st Lt., USAF
Dorothy M. Kuehn, 1st Lt., USA
Barbara E. Lane, 1st Lt., USA
Sara N. Lundy, 1st Lt., USA
Alberta F. Maisey, 1st Lt., USAF
Mary F. McLean, 1st Lt., USA
Joan M. Polidori, 1st Lt., USA
Kay M. Reid, 1st Lt., USA
Marie L. Rodgers, 1st Lt., USA
Nadine G. Sammons, 1st Lt., USA
Mary L. R. Sands, 1st Lt., USAF
Regina H. Schiffman, 1st Lt., USA
Nancy V. Smith, 1st Lt., USA
Mary B. Trees, 1st Lt., USA
Frances O. Vandiver, 1st Lt., USA
Shirley G. Watters, 1st Lt., USA
Helen Wells, 1st Lt., USAF

Women's Medical Specialist Corps

Marilyn J. Anderson, 1st Lt., USA
Helen E. Cruickshank, 1st Lt., USA
Dorothy M. Kinnison, 1st Lt., USA
Elizabeth L. Lambertson, 1st Lt., USA
Dorothy MacFoegen, 1st Lt., USA
Harriet J. A. McKinley, 1st Lt., USA
Olive J. Potter, 1st Lt., USAF
Cora D. Reynolds, 1st Lt., USA
Patricia Wakefield, 1st Lt., USA
Mary F. Westhoven, 1st Lt., USA

DEATHS

PELLIZZARI, Frank Joseph, Lieutenant (DC) USN, Sullivan, Ind.; U. S. Naval Construction Battalion Center, Port Hueneme, Calif.; graduated in 1952 from the St. Louis University School of Dentistry, St. Louis, Mo.; commissioned a lieutenant (jg) 13 October 1952; died 4 September 1955, age 30, in Santa Monica, Calif., of injuries received in an automobile accident.

THE MEDICAL OFFICER WRITES

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Reviews of Recent Books

PERIPHERAL VASCULAR DISEASES, by *Edgar V. Allen,* M. D.; *Nelson W. Barker,* M. D.; and *Edgar A. Hines, Jr.,* M. D. 2d edition. 825 pages; 316 illustrations, 7 in color. W. B. Saunders Co., Philadelphia, Pa., 1955.

This is the second edition of a book which has already earned an outstanding reputation as a reference and text of peripheral vascular diseases. The subject is not one characterized by universal agreement as to mechanism of etiology, symptomatic phenomena, and indicated therapy, and this text is no exception. The various sections are by men who write on the basis of their actual personal experience in clinical practice. Their thoughts and conclusions are forthrightly presented and where areas of controversy exist there has been an endeavor to discuss the several viewpoints.

Subject-wise all of the classical peripheral vascular disease entities are excellently covered. In addition, new and timely matters such as aortography, coarctation of the aorta, technics of sympathectomy, and surgical correction of vascular injuries (to mention but a few) are presented.

The quality of printing, indexing, number and scope of charts and illustrations, and literary style are all excellent.

This text will be useful to all physicians whose clinical practice includes peripheral vascular patients. For others it will provide an up-to-date summary of the most recent experiences and opinions of those intimately working with these diseases.

—*FRANK L. BAUER, Lt. Col., MC, USA*

CEREBRAL VASCULAR DISEASES, Transactions of a Conference Held Under the Auspices of The American Heart Association, Princeton, N. J., 24-26 January 1954. *Irving S. Wright,* M. D., Chairman; *E. Hugh Luckey,* M. D., Editor. 167 pages. Published for *The American Heart Association* by Grune & Stratton, Inc., New York, N. Y., 1955. Price $5.50.

This book is a transcript of a three-day conference of more than 30 authorities in the field of the cerebral vascular diseases, under the chairmanship of Doctor Irving S. Wright. The subject is not discussed exhaustively, but its highlights are covered in a very practical way and in an informal and instructive manner.

The conferees review present knowledge and point out areas needing further study. Fourteen topics, plus the discussions that each provoked, are presented. The result is a "must" for all interested in this important and neglected field. There are many "pearls" to be found in this

book, a few of which are: no vascular occlusion found at autopsy in two thirds of the instances of cerebral infarcts (page 26); the value of vitamin B complex in clearing up mental confusion in elderly patients that erroneously was believed to have been senile psychosis or cerebral arteriosclerosis (page 53); the use of sodium nitroprusside in the treatment of patients with acute hypertensive encephalopathy (page 63); the many factors in differentiating between cerebral thrombosis and hemorrhage (pages 82-98); in China, hypertension as minimal as 150/90 mm. Hg able to produce severe vascular damage (page 120); and the value of serial electroencephalographic studies, including "activated studies" (page 124).—*RICHARD P. JOHNSON, Col., MC, USA*

PAIN, Its Mechanisms and Neurosurgical Control, by *James C. White,* M. D., F. A. C. S., and *William H. Sweet,* M. D., F. A. C. S., with assistance of *Stanley Cobb,* M. D., and *Frances J. Bonner,* M. D. 736 pages; 134 figures; 54 tables. Charles C Thomas, Publisher, Springfield, Ill., 1955. Price $17.50.

This book is well organized with a helpful table of contents, authors' index, subject index, and an extremely valuable bibliography. Statistical data were accumulated over a 25-year period from case histories at Massachusetts General Hospital, Boston; the Queen Elizabeth Hospital in Birmingham, England; the New England Center Hospital, Boston; the U. S. Naval Hospitals at Chelsea, Mass., and St. Albans, N. Y.; and the Cushing Veterans Administration Hospital at Framingham, Mass.

The first part deals with fundamental aspects: the anatomy, physiology, and psychiatry of pain. The second section, on surgical technic, gives in complete workable details the various technics of nerve blocking and operative surgery on the various parts of the nervous system for relief of pain. It emphasizes the dangers and the necessary precautions to be taken, and explains the pathways severed and the limitations of the various methods.

The treatment of specific painful conditions, the third section, includes practically all types of pain and attempted treatment, each individually discussed. The authors' personal experiences are illustrated with typical cases.

This book is a masterful record of painstaking search for the clinical truth in answer to the problem of pain. It contains personal communications from many outstanding neurosurgeons all over the world who are known personally to the authors. These are combined beautifully with a thorough coverage of the literature. The complete honesty of the authors in dealing with such a difficult and perplexing problem is refreshing. It leaves the reader with a feeling that here at last in this volume is a base line and collection of truths from which to build a better understanding of destructive pain.

—*FRANK B. CLARE, Comdr. (MC) USN*

ANTIBIOTICS ANNUAL 1954-1955, Proceedings of the Second Annual Symposium on Antibiotics, edited by *Henry Welch*, Ph. D., and *Félix Martí-Ibañez*, M. D. Second Annual Symposium on Antibiotics Chairman: *Henry Welch*, Ph. D. Sponsored by U. S. Department of Health, Education and Welfare, Food and Drug Administration, Division of Antibiotics. In Collaboration with the Journal Antibiotics & Chemotherapy, October 25-29, 1954, Washington, D. C. 1,154 pages; including graphs, tables, and colored illustrations. Medical Encyclopedia, Inc., New York, N. Y., 1955. Price $10.

The present Annual, like the previous volume, is a compendium of the reports presented at the Second Antibiotic Symposium. The table of contents strongly reflects the stated purpose of the Symposium, which was to bring together clinicians, chemists, and bacteriologists "to study antibiotics from different viewpoints." The volume is devoted entirely to recent scientific information on the pharmacology and therapeutics of an ever-increasing number of antimicrobial agents, and is not in any sense a handbook for the clinical application of antibiotics.

Of particular interest is the extraordinary amount of basic and developmental information contained in this volume. Furthermore, clinical and laboratory investigation has suggested additional applications for antibiotics. Thus, some of the newer antibiotics have been found to be effective antifungal agents, and one has been shown to stimulate growth in children with simple growth failure. Finally, the tumor-suppressing activity shown by certain antibiotics suggests a rather different approach to the treatment of neoplasms and a wider meaning for the term "antibiosis."

The discovery of new antibiotics has kept pace with this developmental progress. Thus 14 new substances with antimicrobial activity are described and preliminary appraisals of their potential effectiveness are recorded.

The editors faced a formidable task in editing the 172 reports that constitute the text. As a result, the style of writing and completeness of bibliography vary with the individual author, and the subject index is incomplete. Nevertheless, the editors are to be commended for the rapidity with which this volume was published. It is an excellent interim summary of the varied aspects of antibiotic research, and therefore of great value to the clinical and laboratory investigator who is primarily concerned with the study of antibiotics.

—*EDWARD L. BUESCHER, Maj., MC, USA*

NEUROLOGY, Volumes I, II, and III, by *S. A. Kinnier Wilson*, M. A., M. D., D. Sc. (Edin.), F. R. C. P. Edited by *A. Ninian Bruce*, F. R. C. P. (Edin.), D. Sc. (Edin.), M. D., F. R. S. (Edin.), Lt. Col. R. A. M. C. 2d edition. 2,060 pages; 279 illustrations. The Williams and Wilkins Co., Baltimore, Md., 1955. Price $37.50 per set of three volumes.

The republication of this reference work has been awaited eagerly by most students of neurology. It is presented in three volumes instead of the previous two, making for easier handling. Fortunately, the former

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adequate format has been retained. Although a work of this kind almost defies revision without a complete rewriting, the original text represented an era in classic descriptive essay at its best, so that complete rewriting would have destroyed its classic and historic flavor. The editor has avoided this and has done exceedingly well in his revision, under the limitations imposed.

A chapter by Russell Brain on aphasia, apraxia, and agnosia is a distinct addition. There have been rapid strides in certain neurologic areas catalyzed by the advent of neurosurgery, so that today a neurologic work of any magnitude must needs be outmoded to a considerable degree by the time it is published. The more recent procedural advances, such as electroencephalography, arteriography, and pneumonography, are not developed or integrated into the text to a degree commensurate with present-day neurologic practice, nor are the rapid advances in the development of the newer drugs for epilepsy, Parkinsonism, et cetera, included.

The bibliography has been increased and is reasonably up to date, although recent references are not present in any quantity. The editor has tried to include the more important advances, but these are occurring at too rapid a rate to allow the text to be as current as one would like. The work is readable, clearly illustrated, and well printed.

The publication of this revised edition makes it available to those who have been unable to obtain a copy of the exhausted first edition, and I believe that its usefulness as a reference work will continue for many years to come. Although not as current as the neophyte neurologist would like, no apology is necessary, for it still remains a neurologic classic. Every serious neurologist will want these volumes for frequent reference and they are highly recommended.

—RICHARD R. CAMERON, Col., MC, USA

THE COAGULATION OF BLOOD: METHODS OF STUDY, edited by *Leandro M. Tocantins*, M. D. 240 pages; illustrated. Grune & Stratton, Inc., New York, N. Y., 1955. Price $5.75.

In the 1930's when dicumarol was discovered, research in blood coagulation flared into activity; and information concerning hemostasis has increased rapidly and untidily ever since. Many theories of coagulation have been constructed, many new factors have been discovered, old ones have been rediscovered, and several names have been given to each of the factors. Confusion has resulted, and all too often attempts to clarify the subject have collapsed in a welter of acrimonious debate. This was only partially due to the "pride of parenthood" that seized investigators who had rediscovered and renamed "new" coagulation factors. Each discovery involved the invention or modification of methods and, as in any field, there were some investigators who seemed incapable of describing methods in such a way that others could reproduce their results. Sometimes years

passed before it could be determined with certainty that the various names bestowed in different laboratories referred to a single factor. Nowadays the dust seems to be settling, and books like this will help.

"The Coagulation of Blood" is a book of methods. Without disparagement it may be called a "cookbook," because the descriptions are so detailed and clear. No attempt is made to present theories of coagulation or descriptions of hemorrhagic and thrombotic diseases. Few alternate methods are given. It has been the editor's aim to present the best one in each case, and in most instances this seems to have been accomplished. It is unlikely that many established investigators will abandon their own methods to use those in this book, but workers who come presently to the field will profit. Perhaps the book may bring a little more coherence into this area, and it certainly can serve as an excellent guide to the clinical pathologist who is called upon to utilize diagnostic methods.

The book was prepared under the sponsorship of the Panel of Blood Coagulation of the National Research Council. The editor has relied heavily upon his fellow panel members as contributors, has made his selections with care, and has insisted upon a high level of presentation. It would be difficult to overestimate the value and importance of this book. —*WILLIAM H. CROSBY, Lt. Col., MC, USA*

DIABETES MELLITUS, by *Henry T. Ricketts*, M. D. American Lecture Series, Publication Number 241, A Monograph in American Lectures in Endocrinology. 123 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1955. Price $3.25.

This little book is a handy guide to the principles of management of diabetes mellitus. The author, an expert in the field, has based this review on common errors and frequent problems encountered at the University of Chicago Clinics.

This reviewer agrees with the statement that "it is high time that the fetish of the fasting blood sugar as a guide to diagnosis be abandoned." The postprandial blood sugar is more logical and convenient. A surprisingly large number of subjects are touched on in the course of this essay. Thus, although insulin preparations are discussed briefly, the recently introduced "Lente" insulin is mentioned. A useful feature is the calculation of the diabetic diet as explained by material modified from lists prepared by the American Diabetes Association.

The advantages of this monograph are that it maintains an eminently practical tone throughout, and that all the recommendations are sound, well established, and accepted. The limitation is that the discussions are too brief in many respects, even for the general practitioner for whom the book is intended. It will be most useful as a practical handbook when used in conjunction with a larger treatise, a combination which would serve as a "consultant" to the practicing clinician.

—*S. O. WAIFE, Lt. (MC) USNR*

ADVANCES IN PEDIATRICS, Volume VII, edited by *S. Z. Levine*, M. D. Associate Editors, *John A. Anderson*, M. D., *Margaret Dann*, M. D., *A. Ashley Weech*, M. D., *Myron E. Wegman*, M. D., and *Warren E. Wheeler*, M. D. 351 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1955. Price $8.

Volume VII continues the fine series of Advances in Pediatrics by outstanding contributors. John Caffey provides a section on fibrous defects in the cortical walls of growing tubular bones, well illustrated by many radiographs.

Meredith Campbell discusses the urinary tract in childhood. He emphasizes, as always, the importance of a systematic routine of urologic examination in infants and children.

Gomez, Galvan, Cravioto, and Frenk of the Hospital Infantil de Mexico present an excellent analysis of malnutrition in infancy and childhood with special reference to kwashiorkor, pointing out the similarity of the clinical pictures of kwashiorkor and malnutrition in various regions of the world where the diet is composed largely of carbohydrates and is deficient in animal protein, fats, vegetables, fruits, and milk.

The section on infantile cerebral palsy by Meyer Perlstein is well planned. Precipitating factors are discussed, as well as classification, clinical types, and associated defects. A broad view of treatment is suggested.

Harry Shwachman and two associates present an excellent discussion of mucoviscidosis, including an outline of differential diagnosis between idiopathic celiac disease and mucoviscidosis.

There is a fine section on congenital megacolon by Orvar Swenson. He believes that most patients will tolerate resection and anastomosis without preliminary colostomy, but that it is imprudent to attempt more than a colostomy in cases of acute obstruction, immense distention, or in newborn or small infants in poor condition. The "pull through" operation is described and postoperative care discussed.

Each section with one exception is followed by a good bibliography. An adequate subject and author index is provided. The volume is highly recommended to pediatricians and pediatric surgeons.

—*MILTON KURZROK, Comdr. (MC) USN*

DISEASES OF THE EAR, NOSE AND THROAT, by *William Wallace Morrison*, M. D. 2d edition. 756 pages; illustrated. Appleton-Century-Crofts, Inc., New York, N. Y., 1955.

Well indexed, simple, concise, clearly illustrated, easy to read, useable material, without verbosity, typifies this revised text. The book is primarily for the undergraduate student, but the material covered and the up-to-date presentation is adequate and more, not only for the general practitioner but also as a quick ready reference for the practicing otolaryngologist. The formulary is not excessive yet contains simple, time-proven medications.

In his first edition Dr. Morrison produced a lucid, terse, well-organized study of the anatomy and physiology and treatment of diseases of the ear, nose, and throat. This fulfilled a basic need for completeness without going into extremes of detail or into the very rare and exotic. He gave adequate bibliographies, with references to more complete works for those wishing to seek further into a specific subject.

In the second edition, this same practice is continued, with the addition of recent references and newer concepts in regard to antibiotic therapy and allergy. Portions of the text are revised and regrouped for easier correlation and reading. One of the biggest improvements is the provision of easier to read symptom and subject indexes.

I should not replace my first edition with the second, as the same basic material is covered nearly word for word in the majority of the text, but to any practitioner seeking a new, quick reference on present-day, up-to-date diagnosis and treatment in basic ENT, this book would be a valuable asset.—*LESLIE O. STONE, Rear Adm. (MC) USN*

OF PUBLISHING SCIENTIFIC PAPERS, by *George E. Burch,* M.D., F.A.C.P. 40 pages; illustrated. Grune & Stratton, Inc., New York, N. Y., 1954. Price $2.75.

This short essay contains much good advice—advice which should be heeded by all writers, readers, and editors of scientific publications. Curiously, it is written in a flat, off-hand style, while, in contrast, the titles of the sections, and particularly the excellent illustrations by Roy Robinson, are humorous and clever. Thus, we have described for us, the "self-plagiarist," the "summary addict," and the "board-o-philiac." The role and responsibilities of the publisher, the lay press, and the benefactor-administrator also come in for their share of comment.

There is no question but that the present situation of scientific medical writing is unsatisfactory, and this little book in a pleasant way has scratched the surface and indicated lines of study and correction. Its message deserves a wide hearing.

—*S. O. WAIFE, Lieut. (MC) USNR*

FORCEPS DELIVERIES, by *Edward H. Dennen,* M. D., F. A. C. S. First volume of a Series of Monographs on Obstetrics and Gynecology. Edited by *Claude E. Heaton,* M. D. 225 pages; 90 illustrations. F.A. Davis Co., Philadelphia, Pa., 1955. Price $6.50.

This book gives detailed instruction in the proper selection and use of the various types of obstetrical forceps, and refutes the old teaching that the good obstetrician need only to "learn how to use one type of forceps and use it well."

A concise history of obstetrical forceps is given as background material. The many relatively new, improved types of instruments and the finer technics in advanced forceps deliveries, representing a dramatic chapter in the history of medical progress, are well covered.

A classification is outlined of forceps operations according to the station of the head in the pelvis. The eight positions in which the fetal occiput may lie at the time of operation are taken up in appropriate and progressive order. Different instrumental operations, manual maneuvers, and choice of instrument are described clearly. The subject matter includes the prerequisites for forceps operations, a detailed description of the proper use of forceps of all types, and the advantages and disadvantages of one type over another under specific existing conditions.

Ninety excellent drawings, which clearly outline position, head, instrument, technics, and the vital points in all operations, reflect the vast experience of the author both in operative work and in teaching at the operating table. The index and bibliography are fully adequate.

This monograph is highly recommended to anyone practicing obstetrics.—*EDWARD A. ZIMMERMANN, Col., MC, USA*

SEMI-MICRO ORGANIC PREPARATIONS, by *J. H. Wilkinson*, Ph.D., F.R.I.C. 94 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1954. Price $2.

Semi-micro technics, described here in a standard text, are coming into increasing demand because of the need for small-scale synthetic reactions in the biologic sciences and wherever it is necessary to conserve material.

The first few chapters are concerned with basic semi-micro technics such as distillation, steam distillation, refluxing, filtration, and melting point determination. The necessary apparatus is well illustrated. Well-written chapters on the preparation of a series of organic compounds cover a large number of the basic organic reactions. The author has selected experiments designed to utilize to the fullest extent the semi-micro equipment discussed in earlier chapters.

The book is well written, concise, and to the point.

—*IRVING GRAY, Lt. Col., MSC, USA*

ADVANCED SURGERY OF CATARACT, by *Daniel B. Kirby*, M. D. 271 pages; 138 figures and 96 illustrations (22 plates) in full color. J. B. Lippincott Co., Philadelphia, Pa., 1955. price $27.

This monograph was the final work of a great eye surgeon, a dynamic personality and a man destined to take his place on the honor roll of world-known ophthalmic surgeons. Cataract surgery was his life study. His first volume, *Surgery of Cataract*, was an exhaustive reference work published in 1950. This second volume was written to emphasize what he considered best in his first work. His wealth of personal experience in methods of meticulous technic and care in the prevention of complications are well described.

The volume contains 13 chapters including advances from the current literature, classification of lens diseases, prognosis, preoperative

preparation, instrumentation and wound healing, aspiration technic for congenital cataract, detailed technics including incision and suturing, complications, and the adjustment of the patient to aphakia. The illustrations are well captioned and beautifully done. The bibliography is extensive.

There is much for any ophthalmic surgeon to learn from this book; however, there are certain dogmatic statements which are controversial. The almost routine use of intravenous curare for akinesia and the heroic method of direct zonular separation, though not generally accepted, obviously worked well in Kirby's hands.

This book is a "must" for every ophthalmologist and should be on the shelf of any library furnishing reference material in ocular surgery.

—JOHN H. KING, Jr., Col., MC, USA

STRESS SITUATIONS, edited by *Samuel Liebman*, M. D. 144 pages. J. B. Lippincott Co., Philadelphia, Pa., 1955. Price $3.

This handy, well-printed volume contains a series of articles by seven authors who are well known in psychiatric circles, on the common theme of emotional reactions to various stressful situations. The articles were originally designed for presentation before the staff and resident physicians and guests of a psychiatric hospital. The papers are published from the stenographic reports of the lectures and include the questions and answers which followed the talks. This gives an informal tone to the book that makes for easy reading, but some of the remarks addressed to the audience seem rather inappropriate for the single reader.

In general, the level in most of these papers was scaled to the most unsophisticated person in the audience. The various chapters seemed rather spotty in quality, but it is realized that this is the point where the personal biases of the reviewer are most likely to appear. The volume concludes with an adequate index. Any profits which may accrue from the publication of this volume are to be donated to the American Psychiatric Association for use in its work.

This very readable volume is recommended to the busy practitioner who wishes to learn something about how psychiatrists evaluate the reactions of human beings to various stressful life situations.

—IRA C. NICHOLS, Capt. (MC) USN

FUNDAMENTAL CONSIDERATIONS IN ANESTHESIA, by *Charles L. Burstein*, M. D. 2d edition. 219 pages; illustrated. The Macmillan Co., New York, N. Y., 1955. Price $5.50.

This second edition encompasses several changes from the original text published in 1949, with added discussions of muscle relaxants, autonomic ganglionic blocks, and antiarrhythmic agents. The text is concerned more with the science of anesthesia than with its technic. The author presents brief, concise discussions of the role of the autonomic nervous system as it modifies respiratory, circulatory, and mus-

cular activites and is in turn influenced by the more common anesthetic drugs and procedures. Many of the conclusions are based upon or obviously influenced by the animal experimentation conducted by the author and others. Of considerable interest to all flight surgeons is the author's statement, "Positive-pressure respiration is abnormal and harmful. It should be avoided."

The art of anesthesia is not entirely neglected. There is an excellent discussion of indications for and methods of respiratory and circulatory control by mechanical and chemical means. The text is logically arranged, profusely illustrated, and adequately referenced. Controversial subjects are essentially ignored. The subject of shock is covered in 20 pages of text, 5 of which are illustrations and references, and of cardiac arrhythmias in 20 pages with 13 pages of illustrations and references. For the student and the busy anesthesiologist the volume can perhaps best be used as a reference index.

—*ROBERT F. CORWIN, Col., USAF (MC)*

SELECTED PAPERS OF DR. FRANK N. WILSON, edited by *Franklin D. Johnston,* M. D., and *Eugene Lepeschkin,* M. D. 1,135 pages; illustrated. J. W. Edwards, Publisher, Inc., Ann Arbor, Mich., 1954. Price $8.

This book contains 53 selected papers of which Dr. Frank Wilson was either author or coauthor. There also is a concise biography of Dr. Wilson, together with his complete bibliography of 152 publications. Although 29 of these did not bear his name as author or coauthor, they came from workers in his laboratory and he contributed greatly to their preparation.

The editors have performed a splendid job in the selection of the papers reprinted or published for the first time in this book. They included those articles that contained the fundamental theoretic or experimental observations of this great American physician and scientist. Because Dr. Wilson never published a text of any kind, this information formerly could be found only in widely scattered journals published over a period of 40 years. Much of this material has become a basic reference source for numerous publications including texts, in the field of electrocardiography and cardiology. Many of these were published by his former associates.

The publication of this material in a single volume has resulted in an extremely valuable book, which should be basic reading material for internists and cardiologists and a frequent source reference for medical students. The many friends and admirers of Dr. Wilson all over the world had hoped that some day this modest person would put together in one book, his thoughts, ideas, and accomplishments. Although he never produced such a volume, this compilation of his selected papers is, in a small way, a substitute. The editors are to be congratulated for a job well done.—*THOMAS W. MATTINGLY, Col., MC, USA*

ANXIETY AND STRESS, An Interdisciplinary Study of a Life Situation, by *Harold Basowitz, Harold Persky, Sheldon J. Korchin,* and *Roy R. Grinker.* 320 pages; illustrated. The Blakiston Div., McGraw-Hill Book Co., Inc., New York, N. Y., 1955. Price $8.

This book reports a study on anxiety and stress in a group of soldiers in airborne training at the Infantry School, U. S. Army, Fort Benning, Ga. The study, made by a distinguished psychiatrist, two psychologists, and a chemist, was conducted on soldiers undergoing a rigid training schedule that was conducive to anxiety and stress.

Various psychologic tests and blood chemical determinations were performed and are presented in 70 tables and 44 figures.

This is a well-written volume, free of typographical errors. There is an excellent chapter on anxiety which will interest every psychiatrist. Selected case histories are interesting reading. The study gives evidence of an immense amount of work, which has been carefully executed; and the conclusions contribute to our knowledge of psychosomatic medicine. The method of conducting the study could well serve as a plan for future studies on emotional problems. Much material contained in this book gives new light on the subject of anxiety and stress.—*FRANCES L. WILLOUGHBY, Comdr. (MC) USN*

GERIATRIC ANESTHESIA, by *Paul H. Lorhan,* M. D. American Lecture Series, Publication Number 245, A Monograph in American Lectures in Anesthesiology. Edited by *John Adriani,* M. D. 90 pages. Charles C Thomas, Publisher, Springfield, Ill., 1955. Price $3.25.

In this era of increased life span, this is a timely monograph. Many people reaching old age have or develop conditions which must be corrected by an operation if they are to spend their declining years in comfort.

The book consists of nine easily read chapters, which follow the time-proved form for books on anesthesia. The first chapter discusses the patient and the effect of advanced years on each organ in the body. Subsequent chapters take up preoperative preparation and preanesthetic medication, surgical management, choice of anesthetic agent, method of administration and management of the anesthetic, and postoperative management.

The author has done an excellent job of compiling and organizing a mass of information not heretofore concentrated in any one place. He has reminded us that by adhering to basic principles; namely, proper hydration and oxygenation, gentleness, and minimal duration of procedure; the geriatric patient can undergo anesthesia and surgical procedure with the same degree of success as patients in a younger age group.

There is an excellent bibliography of 39 articles.

—*JOHN J. SHERIDAN, Maj., MC, USA*

ANALYSIS OF DEVELOPMENT, edited by *Benjamin H. Willier,* Ph. D., Sc. D.; *Paul A. Weiss,* Ph. D., M. D. (hon.); and *Viktor Hamburger,* Ph. D. 735 pages; illustrated. W. B. Saunders Co., Philadelphia, Pa., 1955.

In the words of the authors, the purpose of this book is, "to present a modern *synthesis* of our knowledge of the principles and mechanisms of development." Written in the form of a symposium, the volume draws on a wide variety of animal experimental material to analyze the main problems that have confronted experimental embryologists. Some of the most distinguished figures in American embryology are among the 28 contributors.

No attempt has been made to describe systematically the development of any one organism; rather, experimental material has been organized around the central problems of cell and tissue differentiation. An important section is devoted to cellular structure and metabolism and the possible role of various cytologic organelles in the differentiation of the cell. Another section describes tissue interrelationships in the development of special vertebrate organ systems. The problems of embryologic movements, establishment of organ fields, regeneration, and determination of adult size and antigenic specificity also receive attention. The discussion is abundantly documented throughout from the experimental literature, with an extensive bibliography for each section.

This book is as up to date, complete, and accurate a discussion of the principles and mechanisms of differentiation as can be found, although the fields under discussion are in such a rapid state of flux that some of the material was outdated between the time of writing and publication. As more experimental material comes in, the speculations of the authors may be further supported or invalidated. In such controversial fields, the authors' opinions are necessarily their own, and the reader must make his own judgments on the basis of the evidence presented.

Analysis of Development should be valuable to those interested in the theory of embryology. No attempt has been made to slant the material toward clinically important problems or the human embryo, but study of the material presented should result in a better understanding of the fundamentals underlying purely descriptive human embryology.

—*GORDON B. AVERY*

DIFFERENTIAL DIAGNOSIS OF INTERNAL DISEASES. Clinical Analysis and Synthesis of Symptoms and Signs on Pathophysiologic Basis. 2d revised and enlarged edition. By *Julius Bauer,* M. D., F. A. C. P. 987 pages; illustrated. Grune & Stratton, Inc., New York, N. Y., 1955. Price $15.

This is the second edition and enlargement of an earlier volume by the same author. This volume is divided into two parts, "Leading Symptoms" and "Leading Signs." The first part is subdivided, stressing symptoms by anatomic location. In addition, the part on symptoms in-

cludes chapters on "Disorders of General Feelings," "Disorders of Consciousness," "Vertigo, Nausea, and Vomitus," "Paralysis, Incoordination, and Involuntary Movements," "Cough and Dyspnea," "Diarrhea and Constipation," and "Hemorrhages." The second part is subdivided into the various systems, including fevers, habitus, and a chapter on glycosuria. The title is very all-inclusive and one has the feeling in reviewing the text that one's expectancy is not quite fulfilled. It would be difficult, indeed, to discuss detailed pathophysiology, detailed differential diagnosis, and clinical analysis of internal diseases in 900 pages. In general, both the symptoms and signs are presented in a clear, concise fashion, reflecting the teaching ability of the author. Each chapter is concluded by a summary and a generous bibliography on the points discussed. A generous use has been made of case histories to illustrate many points. While these are instructive, this reviewer believes that the space required might have been more informatively used by elaborating further on the point at hand.

While there are 60-some figures and two tables of very informative value, I believe that a more liberal use of graphs, charts, and other illustrations would be more informative than case histories. Presenting differential diagnosis in this fashion necessitates a number of references in the index to various facets of any one clinical entity.

The author makes a practical approach to the psychosomatic aspects of disease and the neurotic component. The book is well indexed. The text would serve as a good reference in medical schools and hospitals, and as an office reference to the practitioner.

—FRANCIS W. PRUITT, Col., MC, USA

FLIGHT SURGEON'S MANUAL, Air Force Manual Number 160-5. Department of the Air Force, Washington, D. C. 712 pages; illustrated. Air University, USAF School of Aviation Medicine, Randolph Air Force Base, Randolph Field, Tex., July 1954.

Published as an official Air Force manual, this volume is an outgrowth of a small *Flight Surgeon's Handbook* which was prepared by the faculty of the School of Aviation Medicine in 1942. A second edition appeared the following year, and a *Flight Surgeon's Reference File* was published as an official Army Air Forces manual in 1945. The present loose-leaf binding is the most comprehensive publication of aviation medicine ever to appear in one volume.

The manual is composed of 11 sections, of which the first 5 cover more than 500 pages and are of major interest to the practitioner of aviation medicine. These sections are on aircrew effectiveness, preventive medicine, aeromedical aspects of unconventional warfare, aviation medicine research and development, and aeromedical evacuation. The last 6 sections of the book are on administrative military aspects of aviation medicine in the Air Force.

For a work of this scope, the index is inadequate both in the number of entries and in cross references. For example, as common a term as "low pressure chamber" was not included, nor was it found under decompression chamber. Otitis media is given a single page listing, but under dysbarism there are other page references to aerotitis media.

This manual, particularly the first five sections, has been widely recommended for study by physicians preparing for specialty board examinations in aviation medicine. Unfortunately, the book is not for public sale. Copies have been distributed to all Air Force treatment facilities and to each aviation medical officer and, in addition, to leading medical libraries throughout the country. As is customary in official publications, no author credits are given.

—*ROBERT J. BENFORD, Col., USAF (MC)*

TEA, A Symposium on the Pharmacology and the Physiologic and Psychologic Effects of Tea, edited by *Henry J. Klaunberg*, Ph. D. 64 pages; illustrated. The Biological Sciences Foundation, Ltd., Washington, D. C., 1955. Price $1.

For this symposium seven authors presented their views on the various aspects of the effects of tea on the human. There are competent discussions of the effects of tea on body systems and on psychologic functions, and even consideration of the optimum time for brewing and its relation to the caffeine and tannate content of the product. Two of the articles had been published elsewhere. The views of the speakers are uniformly favorable to the ingestion of this beverage. Except for the two articles previously published, the book does not contribute much original information. It may be of interest to those dealing with diet formulations and to physicians wishing to learn the most recent opinions concerning the value of tea.—*PAUL K. SMITH, Col., USAFR*

HISTORY OF THE SECOND WORLD WAR, United Kingdom Medical Series. Editor-in-Chief, Sir *Arthur S. MacNalty*, K. C. B., M. D., F. R. C. P., F. R. C. S. THE ROYAL AIR FORCE MEDICAL SERVICES, edited by Squadron Leader *S. C. Rexford-Welch*, M. A., M. R. C. S., L. R. C. P., R. A. F. Volume I, Administration. 611 pages; illustrated. Published by Her Majesty's Stationery Office, London, E. C. 1, 1954. To be purchased from York House, Kingsway, London, W. C. 2. Price 70s. net ($12.60).

This is the first of three volumes that deal with the Royal Air Force Medical Services in World War II. Concerned primarily with administration, it lays the groundwork for the two succeeding volumes which will treat the Commands and the Campaigns respectively. The three-volume unit is one part of the United Kingdom Medical Series.

The thirteen chapters concern the following topics: manning with medical officers and nursing orderlies; the nursing and dental services; hospitals; accommodations; hygiene and sanitation; medical equipment and supplies; medical arrangements for the Women's Auxiliary Air Forces; air evacuation of casualties; air/sea rescue; medical aspect

of trooping; and prisoners-of-war. Each section is authoritative and readable but unlike previous volumes in the series (*Medicine and Pathology* and *Surgery*), this volume does not include bibliographic materials.

The account has objectivity and balance. Recorded here are the mistakes as well as the successes of the RAF Medical Services. Medical administration is treated within the framework of the major command mission and evaluated accordingly; the medical element *per se* never becomes isolated. At the same time the account reflects the human element.

Medical planners no less than students of military and administrative history will find the narrative of particular interest. For comparative purposes, it is interesting to trace British and American attitudes and policies along similar lines. For example, the British had a 30-year lead over the United States in the organization and development of a separate air force and a supporting medical service. Their experience in such developments as the Central Medical Establishment accordingly provided inestimable help for the harassed U. S. Air Forces which had to improvise along command lines in World War II. Yet, despite their forward-looking organizational advances, the British high command appears to have been just as reluctant as the United States high command to accept air evacuation of the sick and wounded as a routine operating procedure.

For the astute reader there are lessons to learn from careful study of this important volume.—*MAE M. LINK, Ph. D.*

TREATMENT IN PSYCHIATRY, by *Oskar Diethelm,* M. D. 3d edition. 545 pages. Charles C Thomas, Publisher, Springfield, Ill., 1955. Price $9.50.

This edition follows the second edition by about five years and is essentially the same book, with which most psychiatrists are already familiar. Certain subjects that were included as new developments in the second edition have been integrated into appropriate sections of the text; and new material, including some on chlorpromazine and reserpine, appears under the heading of current progress (the final chapter in both editions). A chapter on dynamic psychotherapy replaces one which was formerly entitled "Distributive Analysis and Synthesis." The discussion has been revised and improved considerably, but the basic therapeutic philosophy remains about the same as before. The cases presented are the same as used previously to illustrate distributive analysis.

The scope of this book is very broad, sometimes perhaps to its detriment, but it remains a useful, conservative, general reference in the field of therapeutic psychiatry. The new edition is not sufficiently different from the previous one to warrant having both in one's personal library. —*WILLIAM H. ANDERSON, Lt. Col., MC, USA*

HYPOTENSION, Shock and Cardiocirculatory Failure, by *Paul G. Weil*, M. D., Ph. D. 78 pages; illustrated. J. B. Lippincott Co., Philadelphia, Pa., 1955. Price $2.25.

This pocket-sized edition consists of five chapters. The first chapter gives a concise and simple explanation of the basic facts on the regulation of normal blood pressure. Chapter two consists of a two-page skeleton outline of the "causes of hypotension."

The third chapter presents in brief paragraphs all the various aspects of shock from prevention to treatment, including laboratory and clinical aspects of blood transfusion and blood substitutes. No discussion is made of treatment of shock in relation to insulin reaction, anaphylactic shock, or loss of fluid and electrolytes in burns. Chapter four concerns peripheral vascular dilatation, hypotension resulting from anesthesia, surgical procedures, abdominal emergencies, wound infections, and the use of various drugs. The final chapter concerns cardiogenic hypotension. In conclusion, the book states: "The effects of anoxia are so serious that in severe shock the period during which transfusions and other resuscitative measures may be effective is often measured only in minutes, occasionally even in seconds, but almost never in hours."

The edition has a good index, but is lacking in illustrative material, it has a very short bibliography, and is without case reports to illustrate the various concepts and treatments.

It is recommended for use by students, practitioners, and lecturers who desire a refresher-type pocket manual for quick reference on all of the various facets of hypotension.

—RAYMOND A. LAWN, Col., USAF (MC)

BONE AND JOINT X-RAY DIAGNOSIS, by *Max Ritvo*, M. D. 752 pages; 568 illustrations on 398 engravings. Lea & Febiger, Philadelphia, Pa., 1955. Price $20.

Today the clinician looks to the radiologist for the establishment of early diagnosis in diseases of bones and joints. The radiologist has become an important member of the therapeutic team.

Doctor Ritvo, in this book, has made a real contribution to radiologic literature. He covers the gamut of radiographic findings from congenital anomalies to changes of advanced age. His choice of words and literary description of typical lesions is excellent. The typical examples are beautifully reproduced and are a great adjunct in confirming the diagnosis of the lesion under consideration.

Although this book is published primarily for the use of roentgenologists and resident physicians, it contains much information as a reference book that will prove useful to the other specialties. It would be a definite adjunct to any radiologist's reference library, as it is an excellent treatise on x-ray diagnosis of diseases of bones and joints.

—CHARLES B. PERKINS, Col., USAF (MC)

New Books Received

Books received by the *U. S. Armed Forces Medical Journal* are acknowledged in this department. Those of greatest interest will be selected for review in a later issue.

GYNECOLOGY SURGICAL TECHNIQUES, compiled and edited by *Robert J. Lowrie,* M. D., F. A. C. S. Foreword by *J. P. Greenhill,* M. D. 1st edition. 523 pages; illustrated. Charles C Thomas, Publisher, Springfield, Ill., 1955. Price $17.75.

THE PHYSICIAN AND THE LAW, by *Rowland H. Long.* Foreword by *Milton Helpern,* M. D. 284 pages. Appleton-Century-Crofts, Inc., New York, N. Y., 1955. Price $5.75.

ADVANCES IN INTERNAL MEDICINE, Volume VII. Editors: *Willian Dock,* M. D., and *I. Snapper,* M. D. 311 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1955. Price $8.50.

DIAGNOSIS OF CONGENITAL HEART DISEASE, A Clinical and Technical Study by the *Cardiologic Team of the Pediatric Clinic, Karolinska Sjukhuset,* Stockholm, *Sven R. Kjellberg, Edgar Mannheimer, Ulf Rudhe,* and *Bengt Jonsson.* 649 pages; illustrated. The Year Book Publishers, Inc., Chicago, Ill., 1955. Price $22.

THE HEMORRHAGIC DISORDERS, A Clinical and Therapeutic Approach, by *Mario Stefanini,* M. D., and *William Dameshek,* M. D. 368 pages; illustrated. Grune & Stratton, Inc., New York, N. Y., 1955. Price $11.75.

A HANDBOOK OF HOSPITAL PSYCHIATRY, A Practical Guide to Therapy, by *Louis Linn,* M. D. 560 pages. International Universities Press, Inc., New York, N. Y., 1955. Price $10.

JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION Clinical Abstracts of Diagnosis and Treatment. Published with the Approval of the Board of Trustees, American Medical Association. 627 pages. Intercontinental Medical Book Corp., with Grune & Stratton, Inc., New York, N. Y., 1955. Price $5.50.

'SOUND BARRIER', The Story of High-Speed Flight, by *Neville Duke* and *Edward Lanchbery.* 129 pages; with 20 pages of half-tone illustrations and 11 diagrams in the text. Philosophical Library, Inc., New York, N. Y., 1955. Price $4.75.

THE MANAGEMENT OF ORAL DISEASE, A Treatise on the Recognition, Identification, and Treatment of Diseases of the Oral Regions, by *Joseph L. Bernier,* D. D. S., M. S., F. D. S., R. C. S. (Eng.). 825 pages; with 1,001 text illustrations and 5 color plates. The C. V. Mosby Co., St. Louis, Mo., 1955. Price $15.

PSYCHOLOGY OF INDUSTRIAL BEHAVIOR, by *Henry Clay Smith.* 477 pages. McGraw-Hill Book Co., Inc., New York, N. Y., 1955. Price $6.

PROGRESS IN NEUROLOGY AND PSYCHIATRY, An Annual Review, Volume X, edited by *E. A. Spiegel,* M. D. 645 pages. Grune & Stratton, Inc., New York, N. Y., 1955. Price $10.

HUMAN PATHOLOGY, by *Howard T. Karsner,* M. D., LL. D. 8th edition. 960 pages; 557 illustrations in black and white and 19 subjects in color on 14 plates. J. B. Lippincott Co., Philadelphia, Pa., 1955. Price $15.

SPLENIN A IN RHEUMATIC FEVER, The Testing of Splenin A as an Anti-inflammatory Agent, by *Alvin F. Coburn,* M. D.; *Lucile V. Moore,* M. D.; *Judith Wood,* M. D.; and *Mary Roberts,* R. N., from The Rheumatic Fever Research Institute, Northwestern University Medical School, Chicago, Ill. 87 pages. Charles C Thomas, Publisher, Springfield, Ill., 1955. Price $3.75.

INTRODUCTION TO OPERATING-ROOM TECHNIQUE, by *Edna Cornelia Berry,* R. N., and *Mary Louise Kohn,* R. N., M. N. 154 pages. The Blakiston Division, McGraw-Hill Book Co., Inc., New York, N. Y., 1955. Price $4.

A SHORT HISTORY OF MEDICINE, by *Erwin H. Ackerknecht,* M. D. 258 pages. The Ronald Press Co., New York, N. Y., 1955. Price $4.50.

THE MECHANISMS OF HEALING IN HUMAN WOUNDS, A Correlation of the Clinical and Tissue Factors Involved in the Healing of Human Surgical Wounds, Burns, Ulcers, and Donor Sites, by *Shattuck W. Hartwell,* M. S., M. D., Ph. D. in Surgery, F. A. C. S., F. I. C. S. 166 pages; 44 illustrations. Charles C Thomas, Publisher, Springfield, Ill., 1955. Price $4.75.

ANESTHESIA IN OPHTHALMOLOGY, by *Walter S. Atkinson,* M. D. 101 pages; 42 illustrations. Charles C Thomas, Publisher, Springfield, Ill., 1955. Price $3.25.

ESSENTIALS OF CHEMISTRY, by *Gretchen O. Luros,* M. A. 6th edition. 544 pages; illustrated. J. B. Lippincott Co., Philadelphia, Pa., 1955. Price $4.75.

LABORATORY EXPERIENCES IN CHEMISTRY, by *Gretchen O. Luros,* M. A. 6th edition. 184 pages; 6 illustrations. Designed to be used in Conjunction with 6th edition of *Essentials of Chemistry.* J. B. Lippincott Co., Philadelphia, Pa., 1955. Price $1.75.

APPLIED MEDICAL BIBLIOGRAPHY FOR STUDENTS, by *William Dosite Postell.* 142 pages. Charles C Thomas, Publisher, Springfield, Ill., 1955. Price $4.50.

NURSING PRACTICE AND THE LAW, by *Milton J. Lesnik* and *Bernice E. Anderson,* R. N., ED. D. 2d edition. 400 pages. J. B. Lippincott Co., Philadelphia, Pa., 1955. Price $6.

SURGERY OF THE AMBULATORY PATIENT, by *L. Kraeer Ferguson,* M. D., F. A. C. S. with a Section on Fractures by *Louis Kaplan,* M. D., F. A. C. S. Contributors: *Harry M. Burros,* M. D., F. A. C. S.; *Edwin J. Pulaski,* M. D., D. M. SC. (Surg.), F. A. C. S.; and *Hrant H. Stone,* M. D. 3d edition. 866 pages; 664 illustrations. J. B. Lippincott Co., Philadelphia, Pa., 1955. Price $12.

ESSENTIALS OF PHARMACOLOGY, by *Frances K. Oldham,* Ph. D., M. D.; *F. F. Kelsey,* Ph. D.; and *E. M. K. Geiling,* Ph. D., M. D. 3d edition. 520 pages; illustrated. J. B. Lippincott Co., Philadelphia, Pa., 1955. Price $6.

POLYCYTHEMIA, Physiology, Diagnosis and Treatment Based on 303 Cases, by *John H. Lawrence,* M. D., D. Sc., F. A. C. P. 136 pages; illustrated. Modern Medical Monographs Number 13. Grune & Stratton, Inc., New York, N. Y., 1955. Price $5.50.

ROOT CANAL THERAPY, by *Louis I. Grossman,* D. D. S., Dr. med. dent., F. A. C. D. 4th edition. 399 pages; 347 illustrations on 140 figures, 1 in color. Lea & Febiger, Philadelphia, Pa., 1955. Price $7.50.

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